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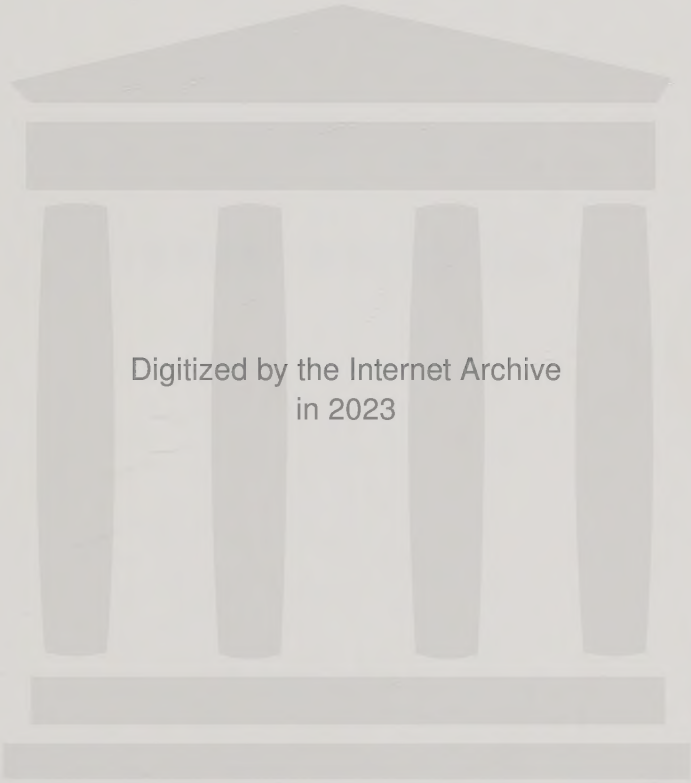
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GREEK MEDICINE

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GREEK MEDICINE

BEING EXTRACTS ILLUSTRATIVE OF MEDICAL WRITERS FROM HIPPOCRATES TO GALEN

TRANSLATED AND ANNOTATED BY

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TO
THE MEMORY OF
DR. FRANCIS ADAMS
OF BANCHORY

PREFACE

All extracts included in this book, except those from Aristotle, have been translated by myself direct from the Greek. As aids I have referred to the following:—

For Hippocrates: Firstly, to the monumental edition of Littré (Greek text with French translation, 10 volumes, Paris, 1839–61). It is this text of Littré's which I have mainly used. Secondly I have consulted the "Œuvres choisies d'Hippocrate" by Littré's younger contemporary and friend, Charles Daremberg of Dijon (Paris, 1855). Thirdly, the excellent English rendering of the "Genuine Works" by Dr. Francis Adams, country practitioner and scholar of Banchory in Aberdeenshire (Sydenham Society, 1849). And lastly, I have been able to compare my versions with the recent English translation of Hippocrates (including Greek text) by Dr. W. H. S. Jones of Cambridge, with whom is associated Dr. E. T. Withington (Loeb Classical Library, 1923). This edition of Jones and Withington, in process of completion, now finally makes the great Father of Medicine easily accessible to the whole English-speaking world. Jones's text I have employed for the Surgical Extracts from Hippocrates as well as occasionally elsewhere in amplification of that of Littré.

In making my renderings from Galen I have used, in the first place, Kühn's text (20 volumes, with Latin translation, Leipzig, 1821–33), and also "Galeni Scripta Minora" (Teubner edition, 1884–93). My own translation of Galen's work on the "Natural Faculties" (Loeb Classical Library, Heinemann, 1916) was, so far as I know, the first English rendering ever published of any work of Galen. From the Greek text of that edition I have retranslated one or two short passages for the present work. Any other texts used are mentioned at the beginning of the respective extracts.

To the Trustees of the Jowett Copyright Fund I am indebted for permission to use the passages from the Oxford Translation of Aristotle.

As regards the value of my own versions, I lay no claim to finished Greek scholarship, but I have been a student of the language since boyhood, and for some twenty years now have been reading Greek medicine in the original. I trust also that my translation of Galen's "Natural Faculties" may be accepted as some criterion of my competence in this respect. My friend Mr. Robert Somerville, scholar of St. John's College, Cambridge, has very kindly read over most of my MSS., and has given me much helpful criticism and advice. For all shortcomings, however, in the matter of translation, I must assume full responsibility.

A. J. B.

North Queensferry, Fife,
April, 1929.

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GREEK MEDICINE

GENERAL INTRODUCTION

Greek Translation

A TRANSLATION into English of an ancient Greek medical work does not involve such a complete substitution of words as might be assumed. The fact, of course, is that a majority of modern medical as of other scientific terms are already Greek, more or less pure. Many words which one would imagine offhand to be entire neologisms, as being based on modern biological conceptions, are actually found in classical Greek, even if perhaps with a somewhat different meaning: such are, for instance—anastomosis, anasarca, anæsthesia, ataxia, catharsis, crasis (eucrasia, dyscrasia), crisis, diapedesis, empyema, epiphysis, hæmatopoietic, lysis, peristalsis, phthisis, physiology, sepsis, sphygmic, synapse, syndrome.

Again certain Greek inflections, such as the plural in *-ata*, are quite familiar to us, *e.g.*, carcinomata, sarcomata. As new scientific conceptions arise at the present day, the Greek lexicon is almost always drawn upon. I would venture to suggest, however, that some of the results, by reason of their highly exotic and imposing appearance, tend occasionally to be taken too seriously, and even to exercise an almost hypnotic influence upon those who are entirely ignorant of Greek. Here then, again, some knowledge of the language proves of value. In Greek we see these portentous terms analysed, resolved into their elements, and presented in more fluid and shifting forms: they are seen, in fact, to be less *absolute* than they appear in English. Thus, for example, a noun becomes less of an entity when we find it occasionally as a verb; in the classical writers, not only do words like *crisis*, *lysis*, *symptom*, *epidemic* appear as verbs (κρίνειν, λύειν, συμπίπτειν, ἐπιδημεῖν), but we observe that such a term as *epilepsy* is merely a kind of

static or congealed form of the word meaning *to seize*, and, in fact, means nothing more than a *seizure*. We had hitherto thought this condition specific and absolute, largely because the word appeared so; here, however, etymology supports the latest clinical observations, according to which "epilepsy" as a hard-and-fast entity has been relegated to the nosological scrap-heap.

Greek, not Latin

All the translations here are from Greek into English. There is still a kind of vague idea abroad that Hippocrates and Galen, like Celsus, wrote in Latin. This superstition is kept up partly by the Latin titles by which their books are still so often referred to; such as—"De Arte Medendi," "De Prisca Medicina," "De Natura Hominis," "De Victu in Acutis," "De Locis Affectis," "De Sanitate Tuenda," etc.

All this is nonsense; Hippocrates and Galen never wrote books with these titles. Their language was Greek, and the reason why their books ever came to be associated with Latin is that, when in the sixteenth century the Greek texts were "rediscovered," the ordinary language of intercourse between educated Europeans happened to be Latin: Latin was, in fact, their vernacular; and hence naturally works in the practically unknown tongue, Greek, had at once to be translated into Latin. It is long now, however, since Latin itself became almost as foreign as Greek to educated Westerners. The time has therefore arrived for having these monuments of Hellenic medicine brought over into our modern vernaculars.

The Greek Vocabulary

But even the most finished translation will always retain a considerable number of Greek words and expressions. While it is true in a sense to say that "nobody knows Greek nowadays," it is also from another and quite legitimate point of view true to say that we—and especially we doctors—are talking Greek every day of our lives. We cannot, nor do we desire to get away entirely from Greek terminology, any more than from Greek thought. In the following pages, where a Greek word has not been allowed to remain as such, but is yet interesting or suggestive, I have occasionally added it, in brackets, after its English equivalent. There are quite a

number of medical words in Greek which are still not employed, or employed very little in English, and which might form really useful additions to our current vocabulary. I would draw special attention to such words as *anadosis*, *prosthesis*, *prosphysis*, *perittoma* (plur. *-omata*), *homoeomerous*, *cacochymy*. Some of these will also be found in brackets or footnotes throughout the book.

The "Physis"

There is one word, however, which, though constantly used by Hippocrates and Galen and representing a fundamental principle of their vitalist biology, is hardly known, as such, in English. Yet in the compound term "physiology" it is of course a commonplace with us. Physiology means "physis-lore," just as the parallel word psychology means psyche- or soul-lore. But while a few scientists would admit—grudgingly no doubt—the possibility of there being such a thing as a psyche or soul, it would be difficult to find offhand one, however well versed in physiology, who would grant the existence of a "physis." Yet what this term would ordinarily appear to mean in Greek is simply the Organism—the organism as a whole, the organism in its unity. The Greek masters of medicine observed, as do our experienced clinicians and general practitioners still, and as our laboratory specialists increasingly fail to do, that the living organism under natural conditions acts primarily as a whole, and that the actions of its parts are naturally subordinated to this supreme function. The more an organism is acting as a whole, the healthier it is; whereas the more its parts act independently of it—"go off on their own"—the less healthy it is.

It is desirable to add here that this principle of organic unity, called *physis* in Greek and commonly translated "nature," cannot in the last resort be fully understood objectively. It has something truly "mysterious" in it and must be accepted as axiomatic in biology and medicine, without further attempts at analysis. Most modern historians of medicine attribute to Hippocrates the statement that *no diseases are divine*, and quote in this connection such of his writings as "The Sacred Disease." On the contrary, it would appear more true to say that he considered *all* diseases to be at least more or less divine and this precisely by virtue

of their *physis* or *nature* (cf. pp. 68, 69, 85). In fact, we may almost say that to Hippocrates the *physis* plays the part attributed by less scientifically minded Greeks to Asclepius, the god of healing.

To Hippocrates and Galen, then, the Physis or Organism was the first term in the equation of life. And the second term was—the Environment. They saw life as a constant interplay between organism and environment. Hence to them there was a greater unity than even the organism itself, and that was life—Life, of which the two poles were Organism and Environment.

The deterministic aspect of life—that in which Environment controls Organism—is emphasised, for example, by Hippocrates in the "Airs, Waters and Places," and by Galen in his treatise "That the Mental Faculties follow the Bodily Constitution," while the reciprocal or libertarian aspect of life—that in which organism controls environment—finds expression throughout the writings of both authors, but especially where the activities of the Physis are in question. To them the organism, though constantly affected by its environment, increasingly mastered it. They saw the organism growing at the expense of its environment, taking from it what was appropriate to its growth (τὸ οἰκεῖον), and rejecting what was irrelevant or foreign (τὸ ἀλλότριον). To them, in fact, disease itself was, in large part, a special case of this "digestion" (*pepsis*) by the organism of its environment, but a case in which the organism was finding unusual difficulty ("dys-pepsia") at the task.

Greek Medicine before Hippocrates

To understand Hippocrates and Galen properly, one must naturally know something of their predecessors, and of the state of medical culture into which they were respectively born. This is no place for a detailed survey of Greek medical history, and I propose only to touch on what I consider its leading aspects. These aspects will also be found, I hope, to be elucidated by the extracts which follow, as well as by the prefaces and notes thereto attached.

We leave aside here the origins of medicine as accounted for by Greek myth and folk-lore—the stories of ancient semi-divine medicine-men such as Melampus, or half-animal shapes like Chiron the Centaur, who taught the healing art to men.

It is noteworthy that the god of medicine, Asclepius, or Aesculapius, was reckoned a son of Apollo, this myth perhaps reflecting the truth that Health is but an aspect or a corollary of full and abounding Life.

For practical purposes our history of Greek medicine begins with the schools of Cnidus and of Cos, as it is directly from these, and especially from the latter, that the Father of Medicine sprang. From the writings of these schools, however, we can see that they were much influenced by earlier or contemporary philosophies, such as those of the Ionian and Sicilian schools, usually known as "pre-Socratic." For Hippocrates and Socrates were practically contemporary, both belonging to the classical or Periclean age of Greece. They were acquainted with the same culture conditions, and both, in their own spheres, made a somewhat similar advance therefrom. Hence pre-Socratic thinkers may in a history of medicine be fitly also termed pre-Hippocratic.

Philosophical speculation, as we know it, seems to have begun on the periphery rather than at the centre of the Greek world. At any rate the early cosmological speculators hailed from Asia Minor and from Southern Italy or Sicily. It has been suggested that it was their more frequent contact with alien civilisations that made the minds of the Ionians and Sicilians more open to new ideas than those of the other Greeks.

The earliest speculators were certain Wise Men from the East—in other words, the group from Ionia in Asia Minor, of whom Thales (*circa* 636–546 B.C.) was the first. They sought for the original principle of all things, and certain of them, like Thales, Heraclitus, and Anaximenes, found this in some one "element," such as earth, air, fire, or water. The Sicilian Empedocles, on the other hand (*circa* 500–430 B.C.), held that all these four elements are original, and that from them, according to the proportion in which they are combined, all other substances originate. Empedocles also taught that the various combinations and separations of these four elements are brought about by two principles which he called figuratively Love and Hate (*storgé* and *neikos*). His theory of elements and compounds thus bears some remote resemblance to modern chemical teaching, and he has been called the Father of Greek Chemistry. He also taught a theory of evolution by natural selection, which reads like a grotesque parody of Darwinism, and which the Latin poet

Lucretius was later on to employ in his famous work "De Rerum Natura." We shall find Hippocrates in his "Ancient Medicine" subjecting to a rigorous criticism the views of Empedocles.

The school of Pythagoras, established at Croton in South Italy, had much influence on biological and medical thought at this time. Pythagoras (*circa* 580–500 B.C.) taught a theory of all-pervading "law," which found its fullest and purest expression in the law of numbers. His therapeutic system involved a rigid discipline, reminiscent of Catholic monasticism, and his insistence on the mystic meaning of numbers played a great part, as we shall see, in the Hippocratic teaching of "critical days."

The Pythagorean brotherhood was broken up, for political reasons, after its founder's death, but as a religious and philosophical sect it held together for at least two more centuries.

Alcmaeon of Croton, a younger contemporary of Pythagoras, is by some reckoned "the Father of Medicine before Hippocrates." Like the Pythagoreans he taught the necessity for a physiological balance or "harmony" of the elements, and this we see later developed in the fundamental Hippocratic doctrine of the "crasis" (mixture, blending, temperament). To Alcmaeon, disease was the "monarchia" or preponderance of any one of the elements over the rest. He did much dissection of animals, as well as embryology. Perhaps his most important generalisation, deduced no doubt from his anatomical researches, was that the brain is the centre of intellect; in this view he was followed by Plato and Hippocrates, although Aristotle and the Stoics later reverted to the older view that mental activity is centred in the heart. Alcmaeon also recognised certain "ducts," by which sensation was carried to the brain. Unfortunately all his writings are lost (cf. p. 103).

Anaxagoras the Ionian, contemporary with Empedocles, came as a young man to Athens, and by his extremely radical views quickly made a name for himself. A freethinker, he paid little regard to the moribund theology of convention, and proved himself the Galileo of a new era by declaring "that the sun was a red-hot stone." He was a "preformationist"; where Empedocles had assumed four elements, Anaxagoras assumed innumerable "spermata" or seeds, which were of as many different kinds as there were things in nature; they were so small, however, that large numbers

of similar ones had to come together before anything became appreciable to sense. Creation or organisation was, in fact, nothing more than this assembling together of similar "seeds"; the different tissues of the body, for example, were already present—though minute and invisible—in the food eaten.

The directing principle in the system of Anaxagoras, corresponding to the Love and Hate of Empedocles, was called by its author "Nous," or Intelligence.

Socrates, in his search for a theory of causation, as described in the "Phaedo," was at first attracted by this Nous-principle of Anaxagoras. He apparently hoped to find in it a philosophical justification for his own conviction of the "dæmonic" element in things. It proved, however, too mechanical a dæmon for the humane Socrates, too much a merely external principle of order imposed upon things.

Anaxagoras, none the less, caused great and valuable fermentation in the minds of the younger thinkers of Athens; this is exemplified notably in the case of the dramatist Euripides. Nor was his philosophy by any means purely destructive, for we hear of him playing a definitely psychotherapeutic rôle; thus, if Plutarch is to be believed, he stabilised the mind of no less a man than Pericles himself. "He taught him to apply reason to Nature; and, freeing him from a terrifying and arid superstition, gave him a religion of peace and good hope."

Finally, a word must be given to Democritus of Abdera in Thrace (*circa* 460–370 B.C.), the materialist *par excellence*, who saw life as resulting from the fortuitous concourse of atoms. His system was the exact antithesis of that of Hippocrates, inasmuch as it denied the first principle of that master's teaching—the unity of the organism. As we shall see, the theories of Democritus, brought over by Lucretius to the Roman world, formed the groundwork of a later system of medicine—that of Asclepiades the Bithynian.

The main error of the pre-Hippocratic physicians, as of the pre-Socratic philosophers, was that they too separated man much from Nature. They failed to see the objective and the subjective as two aspects of one reality, which is life. In their intellectual pride they attempted to subordinate man to Nature, as though he were a mere instance of, and incident among, objectively true cosmic laws. The merit of Hippocrates, as of Socrates, was to bring man back again from

these abstract and inhuman regions, to return him once more to his Mother Earth, thereby restoring his dignity and his capacity for living, and for living happily and healthily.

Hippocrates and the Schools of Cnidus and Cos

The traditional Hippocrates was born about 460 B.C., in the Ægean island of Cos, of an old family of priest-physicians or Asclepiads. He seems to have journeyed much all over Greece, there coming into contact with many other men of mark, among whom may be mentioned Democritus the atomist, Gorgias the father of rhetoric, and Herodicus the gymnasiarch. While Hippocrates travelled much, he appears to have practised mainly at Cos. He died at Larissa in Thessaly about 377 B.C.

There were at least two flourishing medical schools in the Greek-speaking world at this time. With the one on Cos, his birthplace, Hippocrates was no doubt closely connected. Cnidus was not far away, on a peninsula of the Asiatic mainland.

It is usually said that at the school of Cnidus most stress was laid on diagnosis, while Cos rather insisted on prognosis. Cnidus was specialist *à outrance*, like the modern Germanistic school, whereas Cos took broader views, considered the patient as of the first importance, and saw his disease as a process rather than as a condition.

We cannot speak of the "Works of Hippocrates" in the same sense that we do the "Works of Galen." A certain body of writings—the "Corpus Hippocraticum"—has been attributed to the Coan physician, but it is impossible to say what part, if any, of this material was actually from his own hand. Somewhat similarly, the name "Homer" stood for the ancient Epic poetry of Greece. The Hippocratic collection includes many treatises that even contradict one another, but the central core of writings contains a fairly definite doctrine, which is generally accepted as that of the historical Hippocrates. Thus W. H. S. Jones says of "the Epidemic group" (viz. "Prognostic," "Regimen in Acute Diseases," and "Epidemics" I–III): "They impress upon the reader a conviction that they were written by the same man, and at a time before the great period of Greece had passed away." Unless otherwise stated, then, the term Hippocrates will here be understood to apply to the Hippocratic writings.

The Humoral Theory

I have pointed out that to " Hippocrates " the essential life-process was the interplay between individual (*physis*) and environment. Something must now be said about the machinery through which the physis carries on these functions; this brings us to a consideration of the Humoral Theory, whose beginnings long antedated the Hippocratic era. Just as the canonical number of the " chemical " elements became fixed from the time of Empedocles onwards at four, so the various empirically discerned body-fluids became fixed at the same number (blood, phlegm, yellow bile, black bile). Later systematisers also correlated the group of humours with that of the elements. According to Hippocrates and the classical theory of Greek medicine, health existed when these humours were present in the body in proper proportion to each other—that is, when there was a *eucrasia*, a proper mixture or *crasis* of the body-fluids. When one or other happened to be in excess, a *dyscrasia*, or abnormal mixture, resulted. Here can be seen a modification of the teaching of Alcmaeon already referred to. According to the Greek teaching certain people had a natural tendency to excess of one or other of the humours; hence the different " temperaments "—sanguineous, phlegmatic, bilious, and melancholic—which also tended more easily towards diseases of their particular type.

At the present day a considerable reaction is being manifested against the excessive claims formerly advanced by bacteriology, with its theories of specific infection, while a doctrine of temperaments recalling in many ways the old Greek humoral theory is beginning to make its appearance. Thus we no longer look on tuberculosis as being simply the problem of Koch's tubercle-bacillus; we recognise again, with the old clinicians, a strumous or scrofulous " diathesis," which certainly plays an important part in the tuberculosis at least of childhood, is associated with general overgrowth of lymphoid tissue, and probably more or less coincides with the " phlegmatic " temperament of the Greeks. Even in connection with cancer, some observers are inclined nowadays to consider the general condition or *cachexia* (lit. " bad habit ") usually associated therewith to be rather of the nature of a cause than a result.

Here then, we may say, was the organism itself as a cause

of its own diseases. But other important causes came from outside the organism, either reinforcing and co-operating with the natural temperament or acting of their own accord. What were these? Largely, it would seem, an " imbalance," or rather a dyscrasia, or abnormal mixture, in the elements constituting the patient's environment. Thus if one of the " elements," earth, air, fire, or water, or, more generally, one of the corresponding " qualities," dryness or cold, heat or dampness, were greatly in excess in the environment, this would tend to produce excess in the corresponding humours of the patient's body. It must be strictly noted that the term environment here includes, not merely the " Airs, Waters, and Places " as described by Hippocrates, but also all the food ingested by the patient—indeed his *diaita* or " diet," his " regimen " in the widest sense of that term. The question of the effects produced by daily activities will be dealt with under the heading " Function."

The Vis Medicatrix Naturæ

But there was a natural tendency in the organism to heal itself; no sooner did it find the environment acting prejudicially upon it than it in turn reacted. Finding its humours in a state of dyscrasia, it proceeded to bring them back to the proper proportion. The process of cure was known as *pepsis*, usually translated *coction ;* this was a kind of cooking or ripening of crude matter; it was carried on by means of the " innate heat " and resulted in a restoration of eucrasia, and an elimination of the excess matter, or waste products (*perittomata*). In acute diseases (which were in the Greek world mostly of malarial type) this elimination or *crisis* of the offending humours tended to take place on certain definite days of the disease (" critical days "), being effected by sweating, purging, urination, or even hæmorrhage. In practice the process of coction or pepsis amounted to a kind of *digestion*—of the environment by the organism. The three stages are usually called *apepsia* or crudity, *pepsis* or coction, and *crisis*. In more chronic conditions the relation to critical days was less clear, and a more gradual resolution (*lysis*) of the disease took place.

A third possible way of cure was by *apostasis* (rendered " abscession " by Jones), a kind of migration of the disease and its settlement or deposition in other parts (cf. " Prognostic," p. 88).

Relation between Pathology and Physiology

It is important to realise that Hippocrates saw no hard-and-fast line between the pathological and the normal. Pathology is indeed but a department of physiology, for the *physis* is at work in both. The process of pepsis of crude humours, for example, with elimination of irrelevant matters, takes place after every meal. The only essential difference between health and disease is that in the latter the organism has more difficulty (dis-ease) in mastering its environment. Among the environmental conditions which determine or modify disease, Hippocrates lays special stress on the meteorological. Not only do particular physiological and pathological states tend to go with particular climates, but the diseases of one season will tend to vary according to the constitution (*catastasis*) of that season. This broad way of looking at disease has been revived from time to time since the days of the Father of Medicine, notably, for example, by Sydenham, "the English Hippocrates," in the seventeenth century, and is again making its appearance in our own day.[1]

"*Function*" *as a Cause of Disease*

We have considered so far two groups of factors which cause disease, viz. (1) natural or inherited dispositions or "temperaments"; (2) environmental conditions, geographical, meteorological and the rest, and including food and drink. An important third group, however, must also be recognised. A person may be made ill by what he does, by his actions, and particularly by his habitual actions—if these be bad. Such factors are sometimes by biologists called "Lamarckian" factors (cf. p. 182), and, while the preceding two groups can conveniently be referred to as Organism and Environment, a suitable term for the group in question is Function.

Hippocratic Treatment

Hippocrates, like every good practitioner throughout the ages, saw that the organism or *physis* is in the vast majority of cases quite competent to solve its own problems, even if in

[1] Cf. introduction to "Epidemics" in the text, p. 71.

doing so it may have to endure a certain amount of " disease." Hence it is generally best left alone, or, if the conditions are too difficult for it to tackle single-handed, then the physician may so far modify these conditions. " Give the organism," said Hippocrates in effect, " healthy surroundings, food, and conditions of life, and it will as a rule quickly regain health of itself." " There is one mode of treatment," says Plato, " for everything in every ill, and that is to supply it on each occasion with its proper nutriment and its proper functions " (" Timaeus," 90). Similarly, education has been defined as " the provision of an environment." The handling of these conditions in their *ensemble* is called regimen or *diaita*, and this is the essential basis of Hippocratic practice. Hippocrates' methods of controlling environment and function were in no small part a development of those used by the gymnasts, of whom Herodicus of Selymbria had been the most famous. Apart from diet, these methods included bodily activities, such as sawing wood, graduated walks, reading aloud, singing, etc.

But occasionally the problem of disease had to be approached less from the points of view of Environment and Function (" Regimen ") than from that of the Organism itself. Under the best conditions its vital powers might flag, and might then require stimulation, or assistance. Especially it was apt to have difficulty in expelling its waste matters, and here the physician often aided it by administering drugs which had a specially selective action on the various humours. Thus if bile or phlegm were superabundant, a cholagogue or phlegmagogue would be given; if blood were in excess, bleeding would be resorted to; and so forth.

Finally, we must realise that Hippocrates was, above all things, a practitioner, that his outlook was necessarily pragmatist, that the view which he took of his patient's case tended essentially through prognosis to treatment.

After Hippocrates

After the time of Hippocrates his teaching continued as the orthodox canon of medicine for centuries. His followers were called Dogmatists, as making the principles or *dogmata* which he had discovered the basis of their science and practice. They were also called Logicists or Rationalists, as proceeding from these principles by the use of reason or *logos* rather than

using empirical observation. Dogmatism was the mean from which successors of the great Coan diverged in various directions.

Plato and Aristotle

Plato, the pupil of Socrates, was practically contemporary with Hippocrates. There is much of medicine as of general biology in the Platonic writings, and a complete *corpus* of ancient Greek medicine might well contain numerous extracts from his works. The medical allusions are mostly, however, couched in figurative and mystic language, as notably in the "Timaeus," one of his latest writings. Plato's psychology, on the other hand, is deserving of more attention than it receives from our modern mental specialists. No attempt, of course, can be made here to enter in detail into this side of his work. I have thought it well, however, to quote one or two passages from the "Phaedo," which, apart from their intrinsic value, have a direct bearing on later extracts in the present collection, as notably on some from Galen (*v.* p. 21). Galen admired Plato greatly, and repeatedly quotes him. On the other hand, he had little consideration for the sectaries of his time who called themselves Platonists, and who would appear to have been in some sort the "Christian Scientists" of the day, maintaining that the mind was entirely independent of the body (cf. Galen's "That the Mental Faculties follow the Bodily Constitution").

Aristotle, Plato's pupil, and himself tutor to the young Alexander the Great, was, unlike his master, a realist of the first water, and an excellent descriptive and comparative biologist. He is, in fact, the representative figure of the biology of classical antiquity, as is Galen of its medicine; such were the places assigned to these two supreme figures throughout the Middle Ages. Although Aristotle was the son of a physician, and himself doubtless keenly interested in medicine, he did not write definitely medical works. He gave a great impulse, however, to the study of anatomy, later fully developed in the school of Alexandria. Like Plato, Aristotle is often quoted in later days by Galen.

Greek Medicine in Alexandria

The greatest advance in medicine between the time of Hippocrates and that of Galen—a period of five or six hundred

years—was probably that made by the Alexandrian physicians, and among them especially by the anatomists. The whole *Zeitgeist* or spirit of the age—Hellenistic now, and no longer Hellenic—was one of dissection and analysis, which reflected itself not only in literature, art and science, but in social organisation as a whole. Under Alexander the self-contained city-states of old Greece finally disappeared and gave place to a huge imperial organisation, in which the individual tended too much to lose his social value and sense of social responsibility, and to become a mere atom or an object of state administration. The sense of unity, individual and social, was lost, and intellectual effort became concentrated upon the perfection of detail. It was the age of atomistic philosophies and of anatomical medicine: therein it much resembled our own time, in which Western civilisation becomes subordinated to the clashing interests of a few "Great Powers," centred in metropolitan and megalopolitan cities such as Berlin and Paris, Moscow and Rome, London and New York. Under such conditions specialism always flourishes; in medicine the doctors consider everything—except their individual patients!

When Alexander died, his empire broke up into three succession-states, Macedonia, Syria and Egypt; and eventually these were all absorbed by Rome. With the relative eclipse of regional life, the same essential spirit necessarily continued.

In Egypt at this time culture was centred at the university of Alexandria, established by the enlightened Ptolemies (third century B.C.). Here for centuries the special sciences were prosecuted with zest, notably mathematics, astronomy and medicine. In medicine the spirit of Cnidus was necessarily now in the ascendant, rather than that of Cos. Two outstanding figures in the early period of Alexandrian medicine are Erasistratus and Herophilus, both of whom we shall meet with in the following pages. Erasistratus had especially Cnidian affinities, and Herophilus Coan. The former taught a somewhat narrow theory of pathology, which, as we shall see, was a constant source of exasperation in later times to Galen. Erasistratus had an anatomical bias, and explained disease, much as do our modern Osteopathists, by mechanical obstruction to blood and nerve currents. By this time anatomical research had finally discredited the theoretical air-containing ducts (πόροι) which, according to old teachers such as Diogenes of Apollonia and Empedocles, traversed

the body in every direction. But air was realised to be very important, and it could not be itself so easily disposed of. Hence Erasistratus joined up in theory the air-passages and vessels of the lung with the arteries throughout the whole body, regarding the whole as a single pneumatic system. According to this view the air, breath, or pneuma, carried through this system, provided the energy necessary for organic life, while the corresponding matter for growth and repair came from the blood (ultimately, of course, from the food). Between the smallest veins and arteries Erasistratus had discovered (or inferred) minute communicating channels which he termed *synanastomoses*—obviously a foreshadowing of our modern "capillaries." But to him these communicating channels never functioned in health, but only in disease. Thus, when the veins became overloaded with excess of nutriment and its undigested residue, a "plethora" or congestion was brought about, and the excess of blood was forced through the synanastomoses, from the venous into the arterial system. The result was interference with the free movement of the pneuma, and the production of various diseases according to the part affected (cf. p. 157).

Another principle which Erasistratus frequently invoked was that now known as *horror vacui*—"Nature's abhorrence of a vacuum." To explain how it came about that (even in health), when an artery was cut, blood commonly gushed out of it, he maintained that air was what really first escaped, and that, a vacuum thus being caused, blood was then drawn into the arteries from the veins.

The Empiricists

Now, mechanist theories of life, whether atomic or anatomic, are all very well as long as they confine themselves to university laboratories, lecture-rooms, or examination-halls. If, however, any serious attempt is made to apply them to the control of life, they quickly break down. Despite the abundance of specialist theories at Alexandria, people there continued to "go sick." Even anatomy itself proved no panacea. A violent reaction, ending in disruption, now took place against scientific medicine, and out of this emerged the school of the Empirics. Empiricism rejected not only Alexandrian anatomy, but the whole theorising tendency of the orthodox Dogmatic or Rationalist school—their research for various

kinds of causes, their reasoning from principles (*dogmata*), and their comparative method (*analogism*).

To the Empiricists as to modern Homoeopathists, a disease was no entity, but merely a "concurrence" (*syndrome*) of symptoms, for each of which definite drugs were available. In failing to see the disease, however, and concentrating only on symptom-complexes, they also tended to overlook the patient himself (the *physis*)—a most serious omission.

The Empiricists took their stand upon experience (*empeiria*). "It is not," they said, "how we digest but what is digestible that matters"; and again, "Diseases are cured, not by argument, but by medicines."

The Empiricists started from clinical observation. They observed, and remembered their observations; hence they were also called the *teretic* (observational) or the *mnemonic* school. They studied also the records (*historia*) of other observers. Finally, they put all these "experiences," whether made at first hand or by proxy, to the test of repeated experiment (*peira*). While *quâ* sectarians they claimed to reject analogistic reasoning as employed by the traditional or Dogmatic school, yet they were driven eventually to compromise, and their methods called "transference from like to like" and "epilogism" come obviously pretty close to analogy.

The Empiricists claimed philosophical descent from the Greek Sceptics, notably from Pyrrho of Elis. This man, who flourished in the middle of the fourth century B.C., conceived, like his revered master Socrates, a disgust for the sophistry into which philosophical speculation had degenerated. He therefore practically rejected the logical faculties altogether, laying stress on the *acatalepsia* (incomprehensibility) of things (cf. p. 139), whence the necessity for *epoché* (suspension) of judgment, and for concentration on the attainment of *ataraxia* (imperturbability) by vigorous moral living. Pyrrho's critical, sceptical or "agnostic" point of view reminds us strongly of that developed in more modern days by Locke, Hume, and Kant; for the history of medicine it is particularly interesting to remember that Locke, the founder of English Empiricism, himself a physician, was a close friend of Sydenham, the "English Hippocrates," essentially a clinician and empiric, in the best sense of that term. Medically the Greek Empirical school may be said to have been founded by Philinus of Cos, who flourished about a century later than

Pyrrho, and was a pupil of Herophilus. It was systematised somewhat later still by Serapion of Alexandria.

Greek Medicine in Rome

Rome got the medical as well as the other sides of its culture from Greece. *Græcia capta ferum victorem cepit.* The introducer of Greek medicine to Rome was one Asclepiades, a native of Bithynia in Asia Minor, who arrived in the capital during the last century B.C. Asclepiades was a man of vigorous intellect and will, who made up his mind what he wanted, and proceeded to get it. He promulgated a complete new theory of health and disease, and a system of treatment based upon it. He appears to have taken Rome by storm—it was Rome of the dying Republic—and he numbered amongst his clients and friends outstanding figures such as Mark Antony, Cicero, and Atticus. His theory, like that of Erasistratus, was a solidist one, as against the orthodox humoralism of Hippocratic tradition. It was based on the atomic teaching of Epicurus, which had been lately introduced to Rome by the poet Lucretius in his "De Rerum Natura." To Asclepiades all vital functions resulted from the movements of atoms, and disease occurred when these movements became abnormal. Asclepiades had no use for the *physis*, or for any ideas of unity of the organism. The organism, he maintained, had no power of helping itself, and cure could only be brought about by the physician. Since the humours played no part in disease, all methods which proposed to evacuate them, as by bleeding, cholagogues, purges, and the like, were useless. The physician effected a cure by restoring the normal movements of the atoms.

If the doctrine of Erasistratus shows certain parallels with Osteopathy, that of Asclepiades reminds us of yet another modern medical system, also of American origin, namely, the so-called "Electronic Reaction of Abrams" ("E. R. A."). As Asclepiades employed the then new atomic theory in explaining vital processes, similarly Dr. Albert Abrams of San Francisco (1863–1924) did with the modern theory of electrons.

If the doctrine of Asclepiades sounds somewhat trivial, yet we find that, in practice, he had the wit to advocate very much the same common-sense rules of regimen that Hippocrates had laid down as fundamental ages before. Asclepiades

systematised these, however, more than had yet been done. The methods were mechanical, physical, hygienic, and dietetic, including fixed régimes, regulated walks, and other exercises, massage and passive movements, phototherapy and hydrotherapy. The theory was that these procedures acted by restoring the atoms to their normal movements. Doubtless they were quite effective, but doubtless also they acted by putting the organism into such conditions of healthy environment and healthy functioning that it was enabled to heal itself.

Despite Asclepiades, the humoral doctrine was, so far, correct, but it is probable that the great trouble which the orthodox Hippocratists took to deplete the body of its humours was, in nine cases out of ten, quite unnecessary: the body was perfectly able to do this itself. The Hippocratists, in fact, had to a large extent fallen away from that vast faith in the *vis medicatrix naturæ* which their Master had possessed. It must never be forgotten that the foundation of Hippocratic treatment was not drugs but regimen (*diaita*, diet), and it was to this insistence on regimen—meaning in its broadest sense the management of both environment and function—that Hippocrates and Asclepiades equally owed their success. The fact is that Asclepiades was largely, in practice, a Hippocratist, although he undoubtedly added to this sound core that touch of charlatanry which was necessary to ensure him his reputation as Rome's most fashionable physician.

Although the general principles taught by both Asclepiades and Erasistratus were never fully admitted in later times—and were indeed stoutly resisted by the great synthetiser Galen—yet a large proportion of their detailed conclusions had now definitely "come to stay," and, as we shall see, were accepted as more or less axiomatic in all subsequent Greek medicine; Galen himself is witness to this.

Methodism

From out of the strife between medical theorists of various kinds, including the Empirics, whose theory was that there was no theory, arose the Methodists. A *method* we must have, they said in effect, but let it be short and definite. Their method or system was developed from the mechanist views of Asclepiades by his pupil Themison of Laodicea, who

flourished about 50 B.C. According to the Methodists there are two essential classes of disease, viz. those in which the ducts (πόροι, " pores ") of the body are open, and those in which they are closed; these are recognised respectively by free flow and by checking of the normal secretions. Their treatment was by opposites, diseases of relaxation needing astringents, and those of constriction needing laxatives. There was also a third or " mixed " kind of disease, in which constriction and relaxation were both present, and in which the indication was to combat whichever tendency was the more pronounced.

Such was the ridiculously simple system of the Methodists. It had just sufficient correspondence with the facts of clinical observation to secure itself survival value, and it served as a rallying-cry for many who were tired of the endless janglings of the theorists and desired above all things to get on with their practice. We may be sure that on the whole the Methodists, like Asclepiades himself, and like Erasistratus before him, were better than their theory. We shall find them appearing more than once in the following pages; especially we shall read Galen's onslaughts upon their theoretical basis. Nevertheless, as a school they survived for centuries, and apparently included many excellent physicians in their ranks. Indeed, under the early Roman Empire Methodism definitely established itself in a position of supremacy over Dogmatism. One of its leading representatives was Soranus of Ephesus, who lived in the second century of our era, and is our chief authority on the gynæcology, obstetrics, and pædiatrics of antiquity.

Pneumatists and Eclectics

While, however, Methodism had now become, as one may say, the orthodox medical creed of the Empire, still seceding movements did not cease to appear from time to time. Thus, in opposition to the materialistic or atomic theory of Methodism, and partially also perhaps following some temporary decay in its practice, arose in the first century A.D. the school of the Pneumatists, who were associated with Stoicism as was the Methodist school with Epicureanism, and the Empiricists with Pyrrhonic Scepticism. The Pneumatists once more emphasised organismal initiative, relating it, however, more especially to the *pneuma* or vital air.

Erasistratus, of course, had already laid stress on the pneuma, but to him it seems to have been little more than material air (as we should now say, " oxygen "), whereas to the new school of the Pneumatists it was nothing less than the vital principle of the Organism itself. They held that the air was drawn from the lungs into the left side of the heart, and there converted into " natural " and " psychic " pneuma—in other words, into *physis* and *psyche*—the latter proceeding to the brain, whence it was distributed by the nervous system; the physis-pneuma, on the other hand, was, as in the theory of Erasistratus, distributed by the " arterial " or pneumatic system. Health was commonly estimated by the *tonus* of this latter pneuma, as felt at the pulse; in this connection the Pneumatists elaborated a complex pulse-lore.

They also revived discredited Hippocratic humoralism, with its various *dyscrasiæ*. They were strong on logic, and made an elaborate differentiation of diseases. In treatment they seem to have followed pretty well the common-sense principles of regimen as taught by the Methodists. Later Pneumatists preferred to call themselves Eclectics or " Episynthetics." Galen, as we shall see, was considerably beholden to this school.

Rufus of Ephesus

Before coming to Galen, a few words may be said about his immediate predecessor, Rufus of Ephesus, who is also represented by extracts in the following pages. Rufus, like Galen, learned his anatomy in the Alexandrian schools, and, again like Galen, he was able to subordinate all his learning to his art. An eclectic and synthetiser, he practised during the reign of Trajan, in the early part of the second century A.D. His treatise, " On the Interrogation of the Patient," exemplifies his chief excellences, and is quite Galenical (see p. 112).

Galen

And so we come finally to Galen, who put the coping-stone on the edifice of Greek medicine.

Galen was not politically a Greek, but a Roman. The two civilisations had now blended, and the use of Greek was diffused throughout the eastern part of the Empire, and even in the western as a culture-language.

Although Galen and Hippocrates are constantly spoken of together, it must be remembered that they were separated by six hundred years. Galen looks on Hippocrates, Plato, Aristotle, and the great Alexandrians always as " the Ancients."

While Hippocrates is, as we have seen, little more than a spirit—albeit often a very vigorous spirit—animating the Corpus Hippocraticum, Galen is an entirely historical character, a prominent Roman citizen of the second century A.D., about whom we know a great deal, and who wrote a large number of authenticated volumes, which we still possess. We gain indeed almost all our knowledge of Galen's life from these writings; in Kühn's edition of 1821–33 the Greek text, with a parallel Latin translation, occupies twenty volumes. In these Galen frequently lets us into his confidence, and often in a very naïf and engaging manner.

He was born in the year A.D. 130, at Pergamum, in the north-west of Asia Minor, a city of ancient culture, possessing a university, a library, and a medical school only surpassed by the corresponding institutions in Alexandria. Galen's father was Nicon, an architect, a man of both intellectual and moral eminence, who spent very great trouble on his son's education. Nicon was himself an expert mathematician, physicist, and engineer, as well as an architect, and always impressed on his son the fundamental importance of geometrical methods in all the sciences. Galen remembered this advice, and in some of his later work tends to overdo this method—he wishes to make medical truth as demonstrable as a proposition in Euclid.

Galen's mother, if we are to believe his testimony, was a woman of violent and even ungovernable temper. All he learned from her was " how not to do it," and in disgust at her lack of self-control he turned with all the more zeal to his father's unfailing example of moderation and true *sophrosyné*. Nicon gave his boy a name of good augury; he called him Galenus, which in Greek means calm or gentle. As events proved, it was hardly appropriate to the impetuous Galen; possibly without the name his temper might have been worse, but the fact is that there always clung to him a residue of the maternal inheritance which, for all his philosophical training, he was unable entirely to throw off. He frequently refers to the " good fortune " he enjoyed in having been trained by such a father; his words here remind us of

the similar grateful strain in which Marcus Aurelius (soon to be Galen's patron) speaks of the tutors and advisers of his own early days.

Nicon personally superintended his son's elementary education, and then sent him, at the age of fourteen, to study mathematics, logic, and philosophy with the best teachers of the town. The boy learned the doctrines of Plato and Aristotle, of Epicureanism and Stoicism. Ever afterwards he showed a great belief in education, which to him is the next essential after a good inherited "nature." Contrary to what the Stoics maintain, he says, children are not all born good; all the more need then of a thorough education. But good nature and nurture will not be enough, if we do not continue by ourselves the process of education throughout life.

Nicon urged the boy not to give himself out prematurely as belonging to any one school or sect, another precept which Galen never forgot. His father at first hoped that he would devote his life to philosophy, but when Galen was seventeen, Nicon had "vivid dreams," as a result of which he felt impelled to make the boy take up medicine as well. Accordingly, Galen was now put to study at the Asclepieum of Pergamum, and later, after his father's death, he prosecuted his medical studies at Smyrna, Corinth, and especially Alexandria, then still the pre-eminent medical school of the Greek world.

After a nine years' absence we find the young physician back in his native town. He was now twenty-eight years of age, and about this time had a serious illness, caused, it appears, by eating too much fruit. He tells us that he owed his recovery to the family god Asclepius, whose grateful servant he henceforth declared himself. From now onwards also he gave special attention to the study of hygiene.

In Pergamum he obtained the situation of physician to the gladiators. In his later works he usually speaks disparagingly of professional athletes, and probably his new appointment, although affording useful experience, was not too much to his liking. At any rate, after four years of it, he went off to try his fortune in Rome, the centre of the Empire. This was in the year 161, Galen being now thirty-one. The Emperor Antoninus Pius died this year, and was succeeded by Marcus Aurelius, who was ten years older than the Pergamene physician.

In Rome Galen soon made a name for himself. Social life in the metropolis was, however, very corrupt, and medical practice reflected this. Galen's later comments on the life of Rome at this time remind us strongly of the satires of Juvenal dating from the previous century. There had possibly been some improvement under Antoninus Pius, but war was breaking out afresh on the frontiers and big wars are almost always accompanied by social decadence. The predominant medical schools in Rome at the time were Methodist and Erasistratean, and even these apparently existed in a fairly degenerate condition. Their practitioners were for the most part badly educated, indolent, and venal. Galen, on the other hand, was hard-working, quick-witted, filled with ambition and with enthusiasm for the Hippocratic art. He had good friends in the capital, such as the philosopher Eudemus, a fellow-countryman of his own, and the consular Flavius Boethus. At first he seems to have expected to find the other Roman doctors as enthusiastic in the cause of medical progress as himself. He started to give public demonstrations of anatomy in the city, drew crowded audiences, and soon had an extensive private practice. The Emperor himself consulted him for an attack of indigestion (cf. p. 217), and thereafter praised him, to the detriment of the other doctors. Galen had unlimited self-assurance, and his methods of winning notoriety were by no means to the liking of his professional colleagues. They became very jealous of him, mutual altercations ensued, and finally, in spite of his public success, Galen was forced to leave the city in the year 166.

At this period a formidable invasion of the Empire by German tribes from beyond the Danube was beginning, and soldiers who had been hurriedly drafted from Syria to meet the new menace brought with them the plague. The epidemic was beginning to show itself in Rome, and possibly this may also have had something to do with Galen's hurried departure. He had been only four years in the Imperial city altogether, and now he directed his steps once more homewards. Always ready to seize a valuable opportunity, he took occasion on this journey to visit the copper mines of Cyprus, in which were certain ores of medicinal value of which he wished to obtain specimens; similarly he passed through Palestine and procured some of the *opobalsam* or juice-balsam so famous there, probably the same as the scriptural " balm of Gilead."

He was hardly back at Pergamum before an Imperial summons came ordering him to return. The two Emperors, Marcus Aurelius and Verus, were now (A.D. 168) in winter quarters at Aquileia, preparing for a campaign against the Marcomanni. Galen on his way to Aquileia took ship for the island of Lemnos, where he hoped to get some of the famous "Lemnian earth," a medicinal substance. He tells us (*v.* p. 193) that he was on this occasion disappointed, though later he returned to the island and obtained what he wanted.

The plague was now making rapid strides, and the Emperors fled before it to Rome, Verus dying on the way. Galen followed Marcus to the capital, and the Emperor then pressed him to accompany him on the coming German campaign. The Pergamene, however, seems on this occasion to have adopted "safety first" as his motto. He pleaded with the Emperor to excuse him on the ground of a warning he had received in a dream from his family god Asclepius. Marcus accepted his plea, and himself departed for the front, leaving Galen in medical charge of the young heir-apparent, Commodus. Galen's court duties were not onerous, and from this time he seems to have settled down to more constant literary work. After the Emperor's death on the Danube at Vindobona (Vienna) in A.D. 180, Galen continued his connection with the court until the reign of Septimius Severus, dying apparently in the year 201, either at Rome or Pergamum.

The Greatness of Galen

Galen is an encyclopædist, in whose works we may find the essentials of the whole development of medicine from the times of Hippocrates to his own. But Galen's work gives us much more than a mere "boiling down" of all this material. It definitely digests and assimilates it, presenting us with a well-articulated system as a result, a true work of art. Despite his personal foibles—his imperious temper and tendency to self-glorification—Galen was undoubtedly one of the great men of history. He belonged to the same type as Leonardo da Vinci and Goethe—men who to an extraordinary breadth and clarity of outlook, which took in the whole civilisation of their times together with its historical origins, united a perfervid will and moral force which imposed upon them the task not only of themselves assimilating this material, but of handing it on to the people of their generation. Such

men, for their souls' welfare, cannot possibly remain mere dilettantes through life, browsing in many fields of interest; they must master their environment or be themselves overwhelmed.

Galen was sensible of having a mission, and, like many other hot-gospellers, he was often intolerant and over-hasty in his dealings with smaller men, whose slowness arose less from mere obstinacy or, as he supposed, jealousy, than from actual mental inability to keep pace with him.

Galen and Hippocrates. The Physis and the Logos

Galen took his stand upon Hippocrates and his " naturism " —his first-hand, empirical contact with nature or the *physis*. To Galen the Father of Medicine is great, is " divine," precisely because he was " the first of all philosophers and physicians to realise what the physis does." Hippocrates recognised the living organism as the first term in biology, and Galen's work, from one aspect, may be looked on simply as a further elaboration of the physis-lore, the physiology (φυσιολογία) of Hippocrates.

A fundamental contribution of the Pergamene was to bring *logos* or reason to bear on the essentially empirical system laid down by the Father of Medicine. Galen is often indeed contrasted with Hippocrates, as representing reason as against experience. This is, however, incorrect. Galen was a great logician, who undoubtedly added greatly to the Hippocratic Corpus by means of the ratiocinative method. He added, however, to it immeasurably more in real factual content—clinical, anatomical, and physiological. He imposed upon the Corpus Hippocraticum the result of researches made not only by the orthodox Dogmatic school during its long history, but also by the various offshoots or dissenting bodies which had flourished during these centuries, and very notably, of course, by the great school of Alexandria. With all this he united the result of his own researches. The finished product was Greek medicine *à la* Galen, which thereafter held undisputed sway in the medical world for over twelve centuries.

Galen and the Medical Sects

Galen emphatically belonged to no one medical sect or school. If anything, he is usually called a Dogmatist or

Rationalist, because he had not formally broken away from the orthodox school, which traced its descent from Hippocrates and which largely solved particular questions by deductions from his *dogmata* or premisses. But Galen was really much more Hippocratic than these Hippocratists so called. He was much more concerned with nature than they, and hence so far Empiric—although, again, not after the fashion of the sectarian Empirics of his time. Possibly the Pneumatist or Episynthetic school might have had more right than any other to claim him. Philosophically, he was if anything a Stoic, and Stoicism was also the philosophic basis of the Pneumatist medical school. Galen largely uses the pneuma-idea in reinforcement of that of the physis. "Episynthetic" also he undoubtedly was—eclectic and synthetic.

The one sect with which Galen found himself definitely at war was that of Methodism. Any medical theory that attempted to obscure the fundamental fact of the patient's complex individuality and complex environment, and to substitute mere thought-killing labels for diligent research into these, was to him *anathema maranatha*, and he would have none of it—at least as an adequate theory of disease. On the other hand, he incorporated what was good in Methodism —such as the theory of "constriction and dilatation"—with his own system, where it holds a strictly subordinate place. Methodism, with its rule-of-thumb procedure, its denial of individuality, and therefore its virtual sanction of mass-methods of handling the sick, naturally commended itself to the Roman State, and therefore it appears at this time to have stood high in favour, at least among the ruling classes. Hence it was by the official pundits of this school that Galen found himself in the first instance opposed.

As we shall see, he often also came into conflict with the disciples of Erasistratus, who held another mechanical theory, although in this case anatomic rather than atomic.

Galenic Theory

Many of Galen's physiological and medical views will be found illustrated in the extracts which follow, and it is hoped that these, with the help of the short commentaries appended to each, will be found sufficiently understandable by the lay reader. For further details the histories of medicine must be consulted.

As already said, he begins, like Hippocrates, with the physis. Hence his book entitled "The Powers of the Physis," or "of the Nature," otherwise "The Natural Powers or Faculties," may be taken as a convenient and logical introduction to the other works of the Pergamene (cf. Preface, p. v).

I have pointed out that the physis, to Hippocrates and Galen, means for most practical purposes the living organism. It cannot, however, be always, or even usually so translated. Galen speaks of it more exactly, as the physis which "pervades" or "inhabits" (διοικεῖ) the living organism; it is, in other words, the organism's essence, a creative principle immanent within it. But this principle may sometimes be conceived as apart from and transcending its creations; in which case it becomes a "Demiurge," almost a personal God (*v.* p. 154). The physis indeed is really the "Deus in nobis," mysteriously immanent and transcendent at the same time.

But to return to Galen's physiology in the stricter sense. The various characteristic things that the physis *quâ* living organism was seen by Hippocrates and others to be capable of doing are now said by Galen to be done by virtue of certain *powers* or *faculties* possessed by that organism. Among these the forces which promote development, growth, and nutrition are notably "attractive," "retentive," and "expulsive" forces. By virtue, then, of these, a living organism, an organ, or even apparently a unit of living matter, will attract what is akin to it, will digest and assimilate this, and will expel what is foreign to it.

Objection may be made that such refinement of terminology is an abuse of ratiocination, and amounts to logic-chopping. To account for the fact that a living part attracts what is akin to it, have we any right to assume an attractive "faculty"? Is this any more useful than the saying (by a character from Molière) that opium makes people sleep by virtue of a *vis dormitiva?* Galen was, however, in his best moments, fully alive to the danger of verbalisms. While no one could have been more impressed than he with the value of logic in its right place, or more scornful of those who had not been trained to use it, we find him also frequently inveighing against the foolish sophists who quarrel "like jackdaws and crows over words instead of realities." Of entities he held that we cannot do entirely without them, but he would certainly agree with William of Ockham that they are not

to be multiplied "præter necessitatem." At any rate Galen believes he is justified in assuming the "faculties" above mentioned, as well as certain others.

Galen's Teleology

Galen's view, like that of Aristotle before him, is fundamentally teleological. Thus, in his work "On the Utility of Parts" he proceeds from the Aristotelian dictum that "Nature does nothing in vain." In that book he takes upon himself, when demonstrating each part of the body, to show that in the fulfilment of its function it could not possibly have been better constructed. Its structure, according to Galen, is entirely explained by its utility (*cui bono?*).

His main lack here is obviously evolutionary perspective. Many structures have an historical explanation, or at least there are many in which the historical explanation is more to the point than the functional, and so on. Galen expresses himself, however, much more freely in other works, where he often shows a true appreciation of the modifying effects produced by use and disuse, and by environment, and he even begins to envisage creation as something of a continuous process. Thus the idea of modification from an original type shows itself where he says ("Protrepticus," Chap. I) that man is one of the animals, although pre-eminent among them. This view is also implicit in the fact that Galen's dissections were largely made on monkeys, and he assumes that man's structure is in all essentials the same as theirs. Again, he says ("Isagogue," 375) that the sacrum and the sternum each appear to have developed from "several bones growing together."

Historical changes, then, being accepted, what are the factors of these? Galen says in his work "On Habits," that not only do we change our food in assimilating it, but that it also changes us. Similarly, plants are much changed by the soil in which they live, animals by their surroundings. "Thus new properties arise, and come to be on a par with natural properties." In other words, he means that the acquired or "second" nature becomes superadded to the original nature. He just fails to say (or to see) that the original nature might have itself originated in precisely the same manner.

That Galen was a creationist has never been in dispute, but that he was in essence a creative-evolutionist (in the modern and Bergsonian sense) is probably a theory new to most. He does not state it in any definite treatise, and in the " Utility of Parts " he seems even to deny it. A careful compilation of other more spontaneously written passages such as the above would, I think, demonstrate that it was the view most natural to him.

It was essentially Galen's teleology and his physis-lore or physio-logy (in its aspect as a theo-logy) which commended him, as like views did Aristotle, to the mediæval Church. Nineteenth-century medical teaching, fundamentally materialistic, scoffed at both these notions. Properly understood, however, they will both find their place in the reconstructed synthesis of the future.

The Pneuma and the Circulation

A few further notes towards the elucidation of the Galenic extracts in the present volume may be here made.

Next perhaps in importance to the Physis or Organism itself in the system of Galen comes the Pneuma or vital Air, which is needed in order that the various powers or " faculties of the physis " may become operative. Originating in pulmonary respiration, pneuma is distributed through the body by the arteries, as is blood by the veins. Diastole is the active, systole the passive phase of the heart's action. In diastole it dilates, drawing air into its left, and blood into its right side. In systole it collapses, driving them outward again by the same channels. Galen recognises the same anastomoses as did Erasistratus between the smallest arteries and veins, but he held that they functioned in health as well as in disease. A small quantity of air and blood was thus interchanged, as also again through minute perforations (which he had discovered " logically ") in the interventricular septum of the heart. That is to say, Galen knew that blood was carried with air into the arteries. He did not understand, however, the pulmonary circulation, but supposed that air was drawn direct from the minute bronchioles and pulmonary veins (all of which were, of course, " arteries " to him) into the left heart, there mixed with blood which had come through the septum, and carried now as " vital " pneuma to the tissues. Similarly the " psychic " pneuma

was prepared in the ventricles of the brain, and thence conveyed all over the body by the nerves. The liver was the centre of the venous or blood system. The main function of the right heart was to warm the blood, but some pneuma was also drawn into it through the interventricular septum.

It will thus be seen that Galen conceived in a somewhat rude way a blood-circulation through the system; his views, however, of blood and air currents in the lungs were confused, although so far workable.

Other Aspects of Life

Galen incorporates in his system the traditional humoralism of Hippocrates. Our modern *hormones* and their disturbances of equilibrium often recall the *dyscrasiae* of Greek pathology. It is interesting also to recall that to Galen food-stuffs had their humours as well, in which hypothesis we may perhaps see some foreshadowing of our present-day *vitamines*.

Galen is strong on the conception not only of Organism, but of Organism and Environment in their mutual interactions. To him, as already explained, both are conceived as acting, now one and now the other having the ascendancy. In his treatise "That the Mental Faculties follow the Bodily Constitution" it is the determinist aspect that he emphasises, but elsewhere, and by preference, he lays stress on the free activities of the physis; from this point of view life may be envisaged as a kind of digestion (*pepsis*) of the Environment by the Organism, the latter employing its selective and rejective faculties as above explained. (This point of view is also indicated by that Eclecticism so characteristic of Galen's own mental attitude to life.)

Despite the reputation that Galen has for being a mighty theoriser, he is intensely practical in this, that he tests everything in medicine—theory or practice—by the canon whether it is or is not *biopheles*—that is, "useful for life."

Galen's Ethics

Galen probably tended, like his Imperial patron Marcus Aurelius, more to the Stoic than to any other faith, but, as we have seen, all denominationalism, whether in medicine or philosophy, was abhorrent to him, and he defies all our efforts to label him. He is a strong advocate of self-control

and hard work; he pours contempt upon the love of luxury, the laziness, the sycophancy and snobbishness, the lack of self-respect, the general moral and mental cowardice so prevalent at his time. The mother of all the vices, in his eyes, is *pleonexia*, inordinate desire, covetousness; while the highest ideal to aim at is *kalokagathia*, "beauty-plus-goodness," true nobility. To attain this high quality, constant *askêsis* or practice is required.

While in some of his works, such as that on "The Passions," our author is the pure moralist, advocating self-control practically as an end in itself, in the "Protrepticus" and other pieces he becomes rather the ergotherapist, recognising once more that there is a social Environment as well as an Organism, and urging everyone "to the practice of an art."

It is noteworthy that Galen was a believer in dreams. That is to say, while holding that most dreams are purely physiological, being caused by excess of one or other of the bodily humours, he also recognised a class of dreams that were "prophetical"—were indeed of the nature of divine revelations. We may note particularly the "vivid dreams" which persuaded his father to make him a student of medicine (p. 180): the warning which Galen himself received from the family patron-saint Asclepius (p. 177); and the similar "dæmonic" dream which induced him to complete the description of the optic nerves (p. 156).

Galen and St. Paul

Galen reminds us in not a few ways of the apostle Paul, who lived in the century preceding his own. To begin with, both were Roman citizens, Greek-speaking, and natives of Asia Minor. Both were men of the missionary type, each recognising a Master whom he called "divine," whose traditions he followed, and whose gospel he considered it his life's work to develop. At the same time nobody could have been more alive than these two to the dangers arising from denominationalism, to man's supreme need of individual vision. The apostle complains to his flock at Corinth, "It hath been declared unto me of you . . . that there are contentions among you. . . . Every one of you saith, I am of Paul, and I of Apollos, and I of Cephas, and I of Christ. . . . Know ye not that ye are the temple of God, and that

the spirit (*pneuma*) of God dwelleth in you? . . . I have planted, Apollos watered; but God gave the increase. So then neither is he that planteth any thing, neither he that watereth, but God that giveth the increase." And again he says, to the Philippians, " It is God which worketh in you " (ὁ θεὸς γὰρ ἐστιν ὁ ἐνεργῶν ἐν ὑμῖν). In a similar strain Galen laments the sectarianism of his medical contemporaries, " harder to heal than any itch." To him Hippocrates is divine as having been the first to reveal the powers of the creative Demiurge which is in every living thing—" the Physis which pervades the organism " (ἡ φύσις ἥπερ διοικεῖ τὸ ζῶον); but at the same time he says, " I call people ' slaves ' who proclaim themselves Hippocratists or Praxagorists or indeed adherents of any one man."

Many of the Pergamene's treatises are cast in the form of epistles to his disciples.

Paul possibly approached Galen in his knowledge of the prevailing Hellenistic philosophies of the time. Tarsus and Pergamum were both university centres, ranking only second to Alexandria itself. Paul in his Epistles shows some familiarity with the literature of Stoicism. His insistence on the term *pneuma* as an expression of his renewed conviction of personal individuality and worth is quite probably associated with the contemporary renascence of Stoicism, which *inter alia* produced at this time the Pneumatist school in medicine. It is also possible that Paul was partly indebted for his theology, as was Galen for his medicine, to the Alexandrians, as, for example, to Philo, in whose system the Logos or Reason becomes a divine principle, " the first-begotten son of God," " the second God."

But however much Paul and Galen may have been beholden to the best side of Hellenistic thought, they were yet fully alive to the general spiritual decadence that had overtaken the schools. Galen almost as much as the Apostle of the Gentiles was set against " decadent paganism."

Again, Galen's controversies with the medical faculty at Rome are paralleled by those of Paul with the pundits of the Law at Jerusalem.

Both Paul and Galen, in the course of their strenuous lives, made various journeys from one port to another of the eastern Mediterranean and Ægean, and in their writings they give us interesting glimpses of these various coasts and seas.

As missionaries, both of them had the defects of their qualities, showing little tolerance for opposition, and many of their writings are highly polemical in tone.

Like in so many ways, however, as these two men were, and above all, destined as their respective contributions were to become firmly fused within the edifice of Catholicism, it is questionable whether Galen had ever heard of the Apostle to the Gentiles, and almost certain that he had at least never given his message any serious consideration.

Final Note on Galen

It is undesirable in a work such as the present to give long detailed extracts from the anatomical, physiological, or purely medical treatises of this fertile and voluminous writer. It is, however, to be hoped that the excerpts actually submitted will afford some indication of the Pergamene's many-sidedness and breadth of outlook, and will at least whet the appetite of readers for more.

A translation of Galen's writings into English is long overdue, and now that the rendering of Hippocrates (by W. S. H. Jones) is at length a *fait accompli*, it is much to be hoped that we may not have long to wait for an adequate presentation of the work of his great compeer and completer.

Byzantine Medicine

The Byzantine or Eastern Empire outlived the Western by a thousand years. In medicine and science it did not originate anything of outstanding importance. Its main value here was its rigid conservatism; the Byzantine physicians kept alive the body of Greek medicine, mainly in the form established by Galen; they systematised this still further, made learned commentaries on it, and even added to it in detail. No other creative giant like the Pergamene was, however, to appear again.

Nearest to him comes perhaps the great encyclopædist Oribasius (fourth century A.D.), who was body-physician to the Emperor Julian, called the Apostate. Another of the same type but less noteworthy was Aetius, who lived two centuries later; he belonged to Amida in Mesopotamia, and became physician to the Emperor Justinian I at Constantinople.

He was a diligent compiler, and his "Tetrabiblon" deals with the whole subject of medicine. Two specimens of short practical dissertations on surgical topics from his pen are given in the Appendix to the present volume; they are sufficiently illustrative of the best work done by the Byzantines.

HIPPOCRATES

THE HIPPOCRATIC OATH

I SWEAR by Apollo the Healer and by Aesculapius, by Hygiea and Panacea, and by all gods and goddesses, making them my witnesses that I will fulfil according to my power and judgment this oath and this covenant. I will look on him who taught me this art as I do my own parents, and will share with him my livelihood. If he be in need, I will give him money. I will hold his offspring as my own brethren, and will teach them this art, if they wish to learn it, without fee or written bond. I will give instruction by precept and by lecture and by every other mode to my sons, to the sons of him who taught me, and to those pupils who have taken the covenant and sworn the physicians' oath, and to none other besides. According to my power and judgment, I will prescribe regimen in order to benefit the sick, and not to do them injury or wrong. I will neither give on demand any deadly drug, nor prompt to any such course, nor, similarly, will I give a destructive pessary to a woman. In holiness and righteousness I will pass my life and practise my art. . . . Into whatever houses I enter, my entrance shall be for the benefit of the sick, and shall be void of all intentional injustice or wrongdoing, especially of carnal knowledge of woman or man, bond or free. And whatsoever, either in my practice or apart from it in daily life, I see or hear which should not be spoken of outside, thereon will I keep silence, judging such silence sacred.

If then I fulfil this oath and do not violate it, may I enjoy my life and art and be held in honour among all men for ever; but if I transgress and prove false to my oath, then may the contrary befall me.

[*Note.*—The Oath has always been recognised as genuinely "Hippocratic" both in form and substance, although we have no exact knowledge of its origin, nor of the scope of its application; there is no evidence that it was enforced by any of the

medical guilds, such as that of the Asclepiads. It seems a private bond between teacher and taught.

In the above translation I have omitted a sentence which is included in the texts, but which seems out of keeping with the rest of the Oath and with other parts of the Hippocratic writings. In this sentence the physician swears never to cut for stone, but to leave such an operation to mere " craftsmen " or underlings. Quite possibly the passage is an interpolation.]

Greek text: W. H. S. Jones, Vol. 1.

THE FIRST APHORISM

Life is short, the Art long, occasion sudden, experience fallible, and judgment difficult. Not only must the physician show himself prepared to do what is needed; he must make the patient, the attendants, and the surrounding circumstances co-operate with him.

HIPPOCRATES

ANCIENT MEDICINE

Introduction

[This treatise has not generally—except by Littré—been ascribed to Hippocrates himself, although it certainly belongs to the Hippocratic or Coan school. It well exemplifies the characters of this school—its directness of vision, its freedom from bias, its practical aim—in short, its typically Greek *sophrosyné*, balance or moderation. Here we see "Hippocrates" dissociating himself from "philosophy," as in the words of Celsus, "Hippocrates Cous primus ex omnibus memoria dignis ab studio sapientiæ disciplinam hanc (*i.e.* medicinam) separavit." Medicine, says our author, is not like the sciences dealing with what is "above the heavens or below the earth"; these undoubtedly need postulates, but not so the science of healing. He would thus seem to condemn the use of all hypothesis in medicine, but his real meaning is that, while the physicists' hypothesis of "four qualities" is useless in medicine, there is one hypothesis—or, rather, doctrine—which is entirely proper to it, namely, the "humoral."

The beginnings of our art, he says, were quite empirical; experience showed that certain substances agreed or disagreed with an individual according to their strength or quality, and according to the idiosyncrasy of the individual; one can also accustom oneself to varying quantities and qualities of substances. Moreover, there is no hard-and-fast line between health and disease; medicine naturally follows as a corollary of dietetics. Now, he asks, what help in explaining all these observations can we get from assuming that such-and-such foods and drugs are "hot," "cold," "moist," or "dry"? None whatever; this is unwarranted simplification. (Compare Galen's dispute with the "Methodists" of his time, p. 130). There are countless other qualities besides these four, not only in the food we eat but in our bodies as well.

The all-important prerequisite of health is that these various qualities—or, rather, the *humours* exhibiting them—should be well mixed, and that none should be allowed to become isolated; disease, in fact, is a temporary isolation, or an undue prominence, of one or other of these humours, while in the process of healing (otherwise known as *pepsis*, coction or digestion), the disorder is mastered by the bodily forces, the offending humour being thrown out, and a suitable balance or blending (*eucrasia*) of humours thus re-established.

Our author continues: the research into man's origins, which philosophers such as Empedocles undertake, is also useless; better far to consider man's reactions to his environment, to his food and drink, his occupations, and so forth; consider also how function is modified by physical organisation.

Hippocrates thus declares himself strongly in favour of the *autonomy* of medical science; his position is here entirely in line with modern biological thought. "The naturalist," says Professor Patrick Geddes, "must leave physical and chemical inquiries to their special cultivators, and seek his rational view of life within his own order of ideas. For him life is *process*, is *relation*, and these twofold—of Environment in its action upon organism, and of Organism in its reaction upon environment."]

Greek text: Littré, Vol. 1.

[The ancient hypothesis of the Four Principles—Hot, Cold, Moist, and Dry—irrelevant in medicine.]

Many people who undertake to speak or write about medicine base their argument on some *hypothesis*, as of the Warm, the Cold, the Moist, the Dry, or whatever else they may prefer; thus they simplify the problem, and assume as the original cause of disease and death among mankind either one or two principles, and these the same in all cases. In many of their assertions they are quite obviously wrong, but the main count against them is that their errors concern an art to which the world has recourse on the most important occasions, and whose efficient craftsmen and practitioners it holds in the highest honour. Among practitioners there are some bad and some far otherwise. Now, this would not have been the case had there been no real art of medicine, and had no observations been made in it; everybody then would be equally inexperienced and ignorant in the matter, and everything relating to the sick would be governed by chance. But, as a

matter of fact, this is not so; just as the practitioners of all other arts differ greatly from each other in skill and knowledge, so also in medicine. For this reason, according to my own view, it does not stand in need of an empty *hypothesis*, as do occult and dubious subjects, about which hypothesis is absolutely needed if one attempts to discuss them. Thus, for example, if one were to pretend to know and were to declare how matters are in the heavens or under the earth, neither the speaker nor his hearers would have any certainty whether this were true or not, since there is nothing evident to which one can refer for verification.

[There is no short cut to medicine; we must use the established method.]

In medicine, on the other hand, everything has been long since established, and a principle and a road found; by these many fine discoveries have been made throughout a long period, and others will yet be made, if someone who is both capable and at the same time acquainted with the existing discoveries will base his further investigations on these. . . .

Now, it seems to me above all necessary, when speaking of this art, to speak of things familiar to ordinary people, since our task is to investigate nothing else than the illnesses from which these people suffer. . . . If one should fail to catch the attention of the laity and to affect their minds as I have said, he fails also to reach reality. For these reasons also, then, there is no need of any hypothesis.

[Origin of medicine in dietetics.]

The medical art would not have been discovered originally nor indeed investigated (there would have been no need of it), if sick people had benefited from the same food and articles of regimen which healthy people eat, drink, and otherwise use, and if other things had been better. But the fact is that necessity itself caused medicine to be sought out and discovered by mankind, for sick people who took the same food as healthy people failed to benefit, and still fail But, to go yet further back, my own opinion is that even the regimen and diet now used by healthy people would not have been discovered if it had sufficed for man to eat and drink the same things as an ox or a horse or any non-human creature—for example, things which grow from the earth, fruits, brushwood, or herbage; on these things animals grow and live

without suffering, and they need no other fare. Yet I believe that in the beginning man also took similar food, and it would appear that the present articles of diet have been discovered and developed during a long period of time. Thus, when they took raw, undigested substances, possessing powerful qualities, they suffered severely, just as people do now from these things, and they became subject to violent pains and diseases and sudden deaths. It is, of course, likely that in those days they would suffer less, through habituation; yet they would suffer severely even then. Further, most of those who had a weaker constitution would probably die, while the more powerful would hold out longer. Similarly also nowdays in the case of strong foods: some people get through these easily, others with much pain and suffering.

For this reason, then, it seems to me, these people too were forced to seek for a food harmonising with their constitutions, and so found that which we now use. Thus from wheat, by thoroughly macerating, husking, and grinding it, then sifting, kneading, and baking it, they prepared bread; and from barley they made cake (*maza*), putting it also through a large number of processes; they boiled, roasted, and mixed strong and undigested substances with weaker ones, fashioning all of them to the nature and powers of man; they judged that man's nature would not be able to subdue the stronger foods, and that pain, disease, and even death would result from them, whereas such foods as one's nature could control would bring about nutrition, growth, and health.

To this investigation and discovery what fairer or more suitable name could one give than Medicine, since it was certainly discovered for man's health, nourishment, and security, and to replace that regimen from which pain, disease, and death arise.

. . . . . .

[Take, then, Medicine as ordinarily understood; it, like dietetics, is based on experience of what suits or does not suit invalids of various types. Origin of slop diet and liquid diet.]

My own view is, as I said at the beginning, that no one would have thought it worth while to invent the medical art had the same articles of diet suited both the sick and the healthy. . . . But those who investigated and discovered medicine held the same view as those of whom I have already spoken. Presumably, in the first place they would lessen the

quantity of these same foods, giving a little instead of much; this would sometimes be enough for certain of the patients, and would cause distinct benefit. Yet it would not benefit all; some would be so constituted as to be unable to digest even small quantities. As these appeared to need something weaker, *soups* were invented for them, a small quantity of strong food being mixed with a lot of water, and its strength reduced by dilution and boiling. And for such as could not manage even soups, these too were suppressed, and recourse was had to mere fluid drinks, these being kept moderate by regulation as regards mixture and quality, so that they were not taken in greater or less quantities than necessary, nor in a too untempered state.

. . . . . .

[The doctor differs only relatively from the dietician.]

Take then the man who is called doctor, and acknowledged to be a practitioner—he who discovered the regimen and diet relating to the sick. In what way would his attitude seem to differ from that of the man who originally discovered for all mankind the food which we now use, elaborating it from the coarse diet of beasts? My own view is that the method was the same, and the discovery in no way different. The one man sought to remove from the food what the human constitution in health could not master, owing to its coarseness and intemperateness, while the other sought to remove what defied that temporary condition in which anyone may be from time to time. In what way, indeed, does the latter case differ from the former, except in having greater variety of form, and needing greater application, while the former was the commencement of the process?

[Medicine differs from ordinary experience merely in degree.]

If one compares the diet of invalids with that of healthy people, one will find it no less different than that of healthy people compared with that of wild beasts and other animals. Suppose a man suffering from a disease not of the serious and insupportable, nor yet of the perfectly mild type, but such as will show itself if he makes a mistake in diet, and proceeds to eat bread and meat, or something else which people take with benefit when in health. Let him take a small quantity, much less than he could have taken in health. Suppose also another

man, in health and possessing a constitution neither altogether weak nor quite strong. Let him partake of foods such as would be useful and strengthening to an ox or a horse—for example, vetches, barley, or the like—not in great quantity, and much less than he could. The healthy man who did this would suffer no less and run no less risk than the invalid who took bread and barley-cake at the wrong time. All which goes to prove that the whole art of medicine would be discovered, if investigated by this method.

[As bad results from starvation as from repletion. The proper measure cannot be expressed in numerical terms, but is judged by the individual's sensations. Perfect accuracy impossible. It is only in serious cases that the physician's skill matters much.]

And if it were simply, as has been laid down, that all stronger articles of diet injured, while all weaker helped and nourished both sick and healthy people, the problem would be easy; a very safe course would be to tend always towards the weakest diet. But, as a matter of fact, it is no less an error, and no less injurious to man, if he takes a smaller and scantier fare than necessary; starvation has, in man's constitution, great power to maim, to weaken, to kill; many other evils, different from those caused by repletion, but no less serious, arise from insufficient diet; therefore being much more complex, these troubles require greater accuracy in treatment. For one must aim at some measure; but at a measure which is not to be found in a weight or in a calculation of any kind, to which one could refer for accuracy; no measure will be found except bodily sensation.

One's task, therefore, is to become so well informed as not to make more than small mistakes in one or other direction. Personally I would commend extremely highly the physician who makes only small mistakes, for perfect accuracy is seldom to be seen. Indeed, most physicians appear to me to be in the same plight as bad pilots; these, when they are steering a ship in a calm sea and make a mistake, are not detected; but, when overtaken by a storm or violent tempest, it becomes obvious to everyone that, through their incompetence and ignorance, they are bringing the ship to destruction. It is the same with bad physicians (who form the majority); when they treat people who are suffering from nothing serious, and in whose case one might make the greatest blunders without doing any

serious harm (such diseases happen to mankind much more than serious ones)—in these cases their mistakes are not observed by ordinary people. When, however, they meet with an extensive, powerful, and dangerous disease, their errors and their want of skill are apparent to everyone. And the punishment of both pilot and physician is not long delayed; it comes speedily.

[Harm done by deprivation of food. Importance of keeping to one's habit, whether it be of one or of two meals a day; importance also of keeping to a regular hour.]

That man incurs trouble no less from untimely deprivation of food than from repletion may be readily learned by reference to healthy people. Some of them are the better of taking only one meal a day, and, in view of this benefit, they have themselves arranged matters in accordance. Others take a morning meal as well, and this for the same reason, namely, that it agrees with them, and not like those people who have adopted one or the other custom for gratification or from some other arbitrary cause. To the bulk of mankind it makes no difference which their practice is, if they make a habit of taking either one or two meals a day. But there are some people who, as soon as they go outside the practice that benefits them, cannot easily stand this change; if they make any alteration not merely for a day, but even for a part of a day, they suffer grave discomfort. Thus some, if they take a morning meal when this does not suit them, at once become heavy and inactive, both in body and mind, and are seized with yawning, drowsiness, and thirst; then, if they eat supper as well, they have flatulence, griping, and diarrhœa; in fact, in many this becomes the beginning of serious illness, when they simply take on two occasions the very same food that they have learned to take but once. On the other hand, suppose one has learned to eat a morning meal, and this agrees with him; if he should omit this meal, then straightway, as soon as the hour comes, he feels serious loss of strength, unsteadiness, and mental dullness; in these cases the eyes are yellowish, the urine thick and hot, there is a taste in the mouth, the patient feels as if his viscera hung loose; he has vertigo, depression, and difficulty in exerting himself. Moreover, when he now tries to take supper, the food seems less agreeable, and he is unable to eat at this late hour the same diet that he formerly took at the morning meal; as the food

descends, with colic and rumbling, it heats up the bowels; the patient sleeps badly, he has disturbed and alarming dreams. In these cases, too, this is often the beginning of disease.

[Explanation of symptoms described above.]

Now we must consider from what causes these things happened to them. In the case of the man who was accustomed to take one meal, it was, I think, because he did not wait a sufficient time, until his alimentary canal had fully utilised the food taken at the previous meal, and mastered it, and had then become relaxed and reposed; but, while it was still seething and fermenting, he had introduced into it fresh food. Such stomachs digest much more slowly, and need longer periods of rest and quietness. And the man who had been in the habit of taking a morning meal as well was pained because, as soon as the body needed food, and the former supply was used up, and he lacked refreshment, a new supply was not immediately forthcoming; lack of food was what caused him to waste and fall away; to this cause I ascribe all the symptoms above mentioned as happening in such a case. I maintain also that all other people who, in health, remain two or three days without food, suffer the same symptoms as those I have described as happening when the customary meal was omitted.

[A person affected easily by errors of diet is next door to being an invalid. Strange that medicine has attained its present accuracy, considering the state of ignorance whence it sprang.]

For my own part, I maintain that those who react quickly and powerfully to errors of diet are weaker than other people; also that a weak person is very near to being an invalid; an invalid is still weaker, and hence necessarily suffers more when he experiences anything unseasonable. It is difficult, since there is no such accuracy in the Art, always to hit upon the greatest degree of precision; yet many aspects of medicine, to be dealt with later, have attained this precision. Certainly, in my opinion, we must not for this reason reject the ancient Art, if it has not accuracy in all things, as though it had no real existence and were not well based; much rather, it seems to me, owing to its power of approaching near to absolute precision by reasoning, we should receive it and

should marvel how, from a state of great ignorance, it has made the discoveries that it has, so well and so truly, and not in any way through chance.

[To return to those who propose to base the science of medicine on hypothesis: the author takes a case of common experience, and shows how little help is got from the hypothesis of cold, warm, etc., in such a case. Note his almost Socratic *irony* here.]

I desire now to revert to those who, following the new method, investigate our art by hypothesis. For if what damages a man is either hot, cold, dry, or moist, and if it is also necessary that the true healer should treat cold by hot, hot by cold, moist by dry, and dry by moist, let us suppose we have a man, not of a strong but of a weakish constitution; let him eat wheat, such as is brought from the threshing-floor, raw, and unprepared; and, with this, raw flesh; also let him drink water. With this diet, as is well known, he will experience a great deal of serious suffering; he will have pain, his body will become weak and his bowels deranged—in fact, under these conditions he will not be able to live long. Now, what remedy is to be provided for one in this condition? Is it to be hot or cold, or dry or moist? Obviously it must be one of these, since, if one or other of them is harming him, then, according to the argument of these people, it must be removed by its opposite. But the most reliable and obvious treatment is to take away the food he is using, and make him also drink wine; these changes cannot fail to make him well, unless his system is entirely disorganised owing to the long time that the faulty regimen has continued. What, then, shall we say? That he was suffering from "cold," and that what we gave him helped him because it was "hot"? Or conversely? My own view is that anyone who was asked this question would be altogether in a quandary. Did he who turned the wheat into bread remove from it the hot, cold, dry, or moist? For it is treated with both fire and water, and undergoes various elaborations, each of which has its own particular virtue: some of its existing powers it loses, whilst with others it becomes blended and mixed.

[There are countless other factors involved in health and disease besides these four principles. In dietetics the chief point is:—*Is or is not this food too strong for the powers of the*

Organism? Different qualities in the human organism only become harmful when not properly blended. And similarly with qualities in the foods the Organism eats: in most ordinary foods these are well balanced. *N.B.*—With the "qualities" here spoken of as existing in the human organism as well as in the food it eats we may compare our modern "hormones" and "vitamines" respectively.]

This at least I certainly know: that bread has different effects in the human body according as it is fine or coarse, made of wheat winnowed or unwinnowed, mixed up with much or little water, kneaded much or not at all, baked thoroughly or under-baked—and a thousand other differences besides. And the same holds good of barley-cake (*maza*); the properties are powerful in each case, and the one in no way resembles the other. If one fails to consider these points, or, having considered, does not understand them, how can he know anything about human disease? For a man is affected and changed this way or that by every one of these factors, and his whole life is influenced by them whether he be healthy, convalescent, or ill. Surely, therefore, nothing could be more useful or necessary to know about. And so the first discoverers, by investigating properly and with due use of reason, found out these facts regarding man's constitution, and they thought the medical art worthy of being ascribed to a god, as is the established belief. For they did not suppose that it was either the dry, the moist, the warm, or the cold which injured man, or that he had need of any of these, but whatever in anything was strong and more powerful than man's constitution, and which he was unable to master, this they believed to hurt him, and they sought to remove. Now, by the term "strongest" is meant, among sweet qualities the sweetest, among bitter the most bitter, among acid the most acid; in a word, the acme of each quality; all these they saw both existing in man and injuring him. For there is in man bitter and salt, sweet and acid, astringent and relaxing, and a multitude of other things, possessing all kinds of properties, both as regards quantity and strength. Now these, when mixed and blended with each other, are not apparent, and do not cause a man pain, but when any of them becomes separated out and isolates itself from the rest, then also it becomes apparent, and gives pain.

So again with foods; of those which are unsuitable and which cause damage when taken, every one is either bitter, salt,

or acid, or something else unblended and strong; by those, therefore, we are disordered just as by the secretions of the body. But all such food and drink as man habitually takes will be found to be quite devoid of any such untempered and discrepant humours; such are bread, barley-cake, and most similar things which man is accustomed to use (except those which are devised and prepared for his pleasure and satiety). By most of these, when taken into the body, no disturbance is caused, nor is there any segregation of the bodily powers; but for the most part strength, growth, and nutrition result, and this for the simple reason that they are well blended, and contain nothing untempered and excessive, but are unified and simple.

[Those who profess to base themselves on hypotheses yet seem in practice to go by experience, like other people. No food is merely hot, cold, moist, or dry; all these are combined with other qualities, often much more important. Nothing " absolute " in medicine.]

Personally, I cannot understand how those who maintain this doctrine and divert the art from the path described to hypothesis can in any way cure people according to their assumptions. They have not, I believe, discovered anything which is in itself warm, cold, dry, or moist, and not participating in any other quality, but they use, as it seems to me, the same foods and drinks as other people do; they then attribute to this or that substance the quality of " hot," " cold," " dry," or " moist." Now, it would be useless to advise the patient to take something in itself hot; he would at once ask what that was. Hence one must either talk nonsense or have recourse to one or other of the well-known substances. And, since one hot substance may happen to be astringent, another relaxing, while a third may cause disturbance in the body (for there are many other " warm " things which also have many entirely opposite qualities), it will be necessary to administer one of these—either what is hot and sour, or hot and relaxing, or cold and astringent together (this also exists), or cold and relaxing. But my own belief is that entirely opposite effects spring from each of these, and this not when they are applied only to man, but to leather, wood, and many other things more sensitive than man. It is not the hot which possesses the chief power, but the astringent, the relaxing, and all the others which I have mentioned, and this both inside and outside

of man, whether eaten or imbibed, rubbed in, or otherwise externally applied.

. . . . . .

[Examples where heat only a secondary phenomenon, the chief cause being excessive acridity, bile, etc. These are all cured when blended with the other qualities and humours. Diseases caused by hot or cold alone are a class apart.]

All conditions which arise from pure heat or cold, and do not participate in any other quality, come to an end when there is a change from cold to hot or from hot to cold. And so also all the other diseases from which man suffers arise from qualities. Thus, when there is a diffusion of the bitter juice which we call yellow bile, see what anxiety, burning heat, and loss of strength prevail. But when relieved from this by purgation, produced either spontaneously or by means of a drug (if one of these be given in time), the patient is obviously relieved both of pain and heat. But as long as these humours are segregated, unconcocted, and uncombined, there is no possible way by which the pain or fever can be stopped. . . . Nor do these symptoms cease till the acidities have either been purged away or assuaged by combination with the other humours. The coction, change, attenuation, and thickening pass through many and various stages into the form of humours; therefore the crises and the calculation of times in these matters are of great importance. Certainly with all these changes hot and cold have little to do. . . . What, then, are we to see in this change? Mixtures of the humours, having various influences one on another. And whereas the hot will only lose its heat when mixed with the cold, and similarly the cold with the hot, all other things about one become milder and better the more things they are mixed with; and one is in the very best condition when they are concocted and at rest, showing no particular character.

[The philosophers (*e.g.* Empedocles) are again considered. No need to inquire into man's origins, but, on the other hand, all-important to know how he is affected by each item of his environment, by his food and drink, by his occupations, etc. "What is one man's meat is another man's poison." Idiosyncrasies in diet, *e.g.* cheese. Importance of individualisation.]

Certain people, both physicians and sophists, say that one

cannot understand medicine if one does not know what man is, and that this must be learned if one intends to treat people properly. Now, this question borders on the province of philosophy, as in the case of Empedocles and others who have written on nature, on man's beginnings and what he is, and how he first took origin and was put together. For my own part, I think that all this which has been stated or written by physicians and sophists belongs no more to the art of medicine than to that of painting. And I think that nothing certain is to be known about nature save through medicine, and that this can be learned when one has a comprehensive grasp of the subject of medicine; but until this be attained, it seems to me, one is far from having an exact understanding of the question at issue—viz. what man is, by what causes he is produced, and so forth. For I certainly hold it necessary for every physician to know this much at least about nature, and, if he is to fulfil in any way his duty, to take great trouble in finding it out—namely, what are a man's relations to food and drink and to various occupations, and how each person is affected by each. It is not enough to know that cheese is a bad article of food in that it gives pain to anyone eating it to excess, but what sort of pain, and why, and with what principle in man it disagrees. . . . For cheese does not harm all people equally; there are some who may eat of it to satiety without harm; nay, in those whom it suits it will produce wonderful strength; and there are others who get through it with difficulty. The constitutions of these differ, and they differ in this way:—the element in their body which is hostile to cheese is awakened and roused to action by such. And in the cases where such a humour happens to be in greater quantity in the body, and more predominant, these are apt to suffer more. But if it had been harmful to the human constitution in general, everyone would have suffered. Now, whoever knows these facts will not suffer.

[The "post hoc ergo propter hoc" fallacy. Certain things useful at one time, but not at another—baths, walks, occupations, etc.]

In convalescence from disease, as also in protracted diseases, many disturbances arise, some spontaneously, some also from things which the patient happens to take. Now, suppose that on the day when such perturbations arise, any innovation chances to have been made, such as a bath or a walk having

been taken, or something unusual eaten; I know that, even if these were all perfectly proper, yet the bulk of physicians, just like the laity, would nevertheless ascribe the cause to one of these things, being ignorant of the true cause, and obscuring what was probably the most useful thing that could have happened. This should not be: one ought to know the effects of a bath taken or toil engaged in, at the wrong time; the same mischief will never arise from both of them nor from repletion, nor from such and such a food.

[Diseases depend not only on humours but on bodily structure. Various shapes of organs.]

It seems to me also necessary to know which of man's diseases arise from the *powers*, and which from the *structures*. What do I mean by this? By powers I mean the intensity and strength of the humours, and by structures the conformations of the body. Some structures are hollow, and contract from broad into narrow. Some are expanded; some solid and round; some broad and suspended; some tense; some long; some dense; some slack and exuberant; some spongy and loose in texture.

. . . . . .

There are many other kinds of structures, both on the inside and the outside of the body, which differ greatly from one another in the way they are affected both in disease and health; such as whether the head be large or small, the neck slender or thick, long or short; the bowels long or round; the chest and ribs broad or narrow; and countless others, all of which you must learn, and the difference between them; thus, knowing the cause of each, you can take proper precautions.

. . . If a man can in this way successfully conduct his investigations from without, he will also always manage to choose the best possible treatment. And the best is always that most remote from the unsuitable.

HIPPOCRATES

AIRS, WATERS, AND PLACES

Introduction

[This work deals with a fundamental aspect of Hippocratic teaching—the influence of Environment on Organism. An important theme treated of in "Ancient Medicine" was the reaction of the organism to its food and drink, to its physical structure, and so forth. These, of course, are, strictly speaking, environmental factors also, but in "Airs, Waters, and Places" the term Environment is used in its more ordinary or geographical sense.

The action of Organism on Environment—the complementary aspect to the above—is, of course, dealt with *passim* throughout the Hippocratic writings, where the extreme importance of organic initiative (*physis*) is constantly being emphasised. Life is, however, a see-saw between *Milieu* and Organism, and in the present work we find the former specially stressed.

Galen, in his important treatise dealing with the deterministic aspect of life, "That the Mental Faculties follow the Physical Constitution" (*infra*, p. 231), quotes extensively from "Airs, Waters, and Places," which has obviously inspired him. Its general thesis has constantly been stated anew from age to age, notably last century in the sociological works of such writers as H. T. Buckle and Henri Taine, and again by thinkers without number in our own day.

Hippocrates here urges the doctor to engage in what is often nowadays called "regional survey." If we wish, he says, to know the diseases that are likely to predominate in a certain locality and at a certain time of year, we must find out various facts about that locality—facts about its climate, situation, water-supply, prevalent vegetation, and so forth. The first part of the book (Chapters 1 to 11) treats mainly of the effect of environmental factors on health; while in the second half (Chapters 12 to 24) we have chiefly the effect of climate on racial constitution and characteristics; in this latter section there are interesting contrasts between

various peoples of Europe and Asia; here, in fact, Hippocrates may be considered one of the founders of history. Indeed, the resemblance between this part and many of the descriptions of foreign nations given by Herodotus is remarkably striking; in one case both writers even deal with the same disease, that of impotence amongst the Scythians (Hipp., Chap. 22; Hdt., I, Chap. 105), although, characteristically, while the Father of Medicine gives it a "natural" explanation, the Father of History ascribes it to the wrath of an offended goddess.

It is to be observed that Hippocrates considers the action of Environment upon Organism to be a direct one; thus in Chap. 24 he says that in a rugged country where the seasonal changes are marked the bodies and character of the people will show great contrasts. It would be more exact to say that the geographical environment determines the occupations, and these the people's constitutions and characters; the action of the environment is thus indirect.

Hippocrates would appear to hold that character, after being thus formed by various environmental influences, is thereafter transmitted and perpetuated by heredity. Here not a few modern biologists will doubtless join issue with him.

We may usefully contrast Hippocrates with his Athenian contemporary, Socrates, who, as a purely ethical teacher, took little notice of man's environment, whether rural or urban.

The determinism of this book is, after all, mainly relative. Hippocrates would never agree that man, however much modified by circumstance, is always mere clay in its hands. Despite the intractability (*ateramnia*) of natural conditions, he repeatedly exhibits to us man as victorious over them; hard times will often "bring out" latent energies which the individual would not otherwise have employed.

There is nothing of the absolutist about the great Coan; he does not speak dogmatically. "People," he says, "under such and such circumstances, *tend to* (εἰκός) show such and such peculiarities."

One of the limitations, of course, of "Airs, Waters, and Places" is that it only deals with life in space—with the geographical aspect of life. The other, the historical or time-aspect, forms the main theme of other works by our author, as notably the "Prognostic" (also included in the present volume, p. 83).]

Greek text: Littré, Vol. 2.

[In order to understand local diseases, study first all aspects of the locality and of its people's life.]

(1) Whoever wishes to investigate medicine properly must proceed as follows. First he must consider what powers each season of the year possesses. For the seasons are by no means alike: they differ widely both in themselves and in their changes. Next he must take account of the winds, both warm and cold, especially those common everywhere, but also those peculiar to each locality. Similarly, the qualities of waters must be considered; just as these vary to the taste and in weight, so also each has a property quite peculiar to itself. Thus when anyone comes to a city which is strange to him, he should thoroughly examine its situation, how it lies with respect to the winds and to the sun's rising; for a city exposed to the north has not the same qualities as one exposed to the south, nor one lying towards the rising sun the same as one turned towards its setting.

Those points are to be most carefully considered; also what kind of water the people have; whether they use waters that are marshy and soft; or hard, coming from elevated and stony places; or brackish and intractable. Account must also be taken of whether the soil is bare and unwatered, or tree-clad and well watered; its situation low-lying and close, or elevated and cold. Also what manner of life (*diaita*) the people enjoy; whether they are heavy drinkers and eaters and impatient of toil, or are, on the other hand, lovers of exercise and labour, given to eating but not to drinking.

(2) And it is from these considerations that each special case is to be studied. Thus, if one who is well acquainted with these points, preferably all, or at least with most of them, comes to a town with which he is unfamiliar, he will not fail to realise what are the diseases peculiar to the place, or the local forms assumed by general ailments; hence he will not be at a loss how to treat the diseases and will commit no blunders—a thing likely to happen where one makes his forecast in each particular case without this previous knowledge. And, as the season and the year advance, he can tell all the epidemic diseases that are going to attack the city, either in summer or winter, as also those diseases peculiar to each individual which are likely to occur from change of regimen. For knowing how the changes of the seasons and the risings and settings of the stars come about, he can predict what kind of year is going to follow. By these considerations,

and knowing the times in advance, he will have the fullest knowledge regarding each particular case that arises, and will succeed best in the preservation of health; in short, he will not fail to prosper greatly in his art.

Now some may consider all this a matter of meteorology. Let them, however, change their point of view and they will come to realise that astronomy is of no small service to medicine—nay, of very great service—for, with the seasons men's diseases, as also their digestive organs, undergo change.

[Various exposures—easterly best.]

(3) I shall now state clearly how each of the aforesaid points is to be examined and tested. Consider a city which lies exposed to hot winds, namely, those which blow between the rising and setting of the sun in winter [*i.e.* south winds]; while open to these, it is sheltered from north winds. In this city the waters are abundant and saltish; they will necessarily come from a shallow source and be warm in summer and cold in winter. The heads of the inhabitants will be moist and full of phlegm, and their digestive organs frequently disturbed, owing to the phlegm running down into them from the head. In appearance these people will be mostly lacking in tone, and they will not be able to eat or drink much; for those who have weak heads are not good at drinking; they suffer more from the after-effects than do others.

The following diseases are endemic. In the first place the women are sickly and subject to discharges; again, many are sterile, not by nature but through disease, and they frequently miscarry. The children are prone to convulsions and asthmas. . . . The men suffer from dysentery, diarrhœa, ague, long-continued winter fevers, frequent nocturnal irritation, and anal hæmorrhoids. There are not many cases of pleurisy, pneumonia, ardent fevers, and all those diseases which are reckoned acute; such ailments cannot prevail where the bowels are loose. Ophthalmias also occur, moist in character, not serious, of short duration, unless when, owing to change of season, there is an outbreak of epidemic disease. When the fiftieth year is past, defluxions from the brain render people paralytic, if their heads are suddenly struck by the sun or chilled.

Such are the diseases endemic in these places. Apart from this, they are liable to such epidemics as may break out owing to a change of season.

(4) And the following applies to cities which have an opposite situation, being exposed to the cold winds between the summer setting and rising of the sun [*i.e.* north winds]; these winds are characteristic of them, and they are at the same time sheltered from the south and warm winds. Firstly, then, the waters there are for the most part hard and cold. And the inhabitants are necessarily sinewy and lean; in most of them the alimentary canal is costive and hard in its lower parts, and more relaxed above; they are inclined rather to bile than phlegm; their heads are healthy and hard; they tend mostly to rupture. The diseases endemic among them are as follows. Pleurisies and the maladies reckoned acute are common; this is necessarily so from their intestines being hard. Also abscesses readily form from any slight cause, the reason being the state of tension and hardness of the bowels; for this dryness, together with the coldness of the water, disposes to rupture. With such constitutions, they must be fond of food, but not great drinkers, for people cannot be both great eaters and great drinkers. In time ophthalmias occur, which become hard and resistant, and the eyeballs easily rupture. In summer men under thirty years of age suffer from violent bleedings at the nose. Cases of the disease called " sacred " are few, but violent. These people tend to be more long-lived than others. Where they have open wounds, these do not show serous discharges, or become malignant. Their habits are fierce rather than mild. As regards the men, these are the endemic diseases. Apart from these they are liable to any general epidemic which may break out owing to a change in the seasons. As for the women: in the first place many of them develop a rigid habit of body, owing to the waters being hard, intractable, and cold; their monthly discharges do not come readily, but are scanty and of bad quality. Secondly, they bring forth with difficulty, yet they are not unduly prone to abortion. After bearing children they are unable to nourish them, since their milk dries up from the hardness and intractability of the waters. Frequently childbirth leads to phthisis, since the exertion causes ruptures and strains. The children suffer from dropsy of the testicle while young, but as they become older this disappears. In such a city they are late in arriving at manhood.

(5) Regarding such cities as are exposed to winds blowing between the summer and winter risings of the sun [*i.e.* east

winds], and those having the opposite exposure, the following holds:—In the case of those which look towards the risings of the sun: they are of necessity healthier than those looking northwards or towards the warm winds, even if the distance between them be no more than a furlong. For, in the first place, there is more moderation both in heat and cold, and, secondly, such waters as are exposed to the sun's risings are necessarily clear, fragrant, soft, and delightful in such a city; for the sun, as it rises and shines upon them, purifies them by dispersing the haze which usually prevails at dawn.

The inhabitants are in appearance of a fresh or more healthy complexion than elsewhere, unless some disease prevents this. They have clear voices, and in temper and intellect are better than those exposed to the north, just as all the natural productions are better here. A city so situated is likest to the season of spring, owing to the moderation of its heat and cold; diseases are fewer and less severe, and resemble those in the cities exposed to warm winds. The women here conceive readily and have easy labours.

(6) So much then for these. As for cities exposed to the settings of the sun [*i.e.* westerly exposure] and sheltered from east winds, and which are scarcely touched by the warm winds or by the cold north winds—in these the situation is bound to be most unhealthy. For, firstly, the waters are not clear; and the reason for this is that the mist which usually prevails in the early morning becomes mixed with the water and destroys its clearness, as the sun does not shine here till it has risen high. And while, in the early mornings of summer, cold breezes blow and dews fall, yet for the rest of the day the sun, as it advances westward, thoroughly scorches the inhabitants; hence they tend to be pale and weakly and to participate in all the diseases already mentioned, none being peculiar to them. Their voices also are apt to be deep and hoarse, owing to the air being generally impure and unhealthy; for it is not much purified by the north winds, since these seldom blow here; what winds do chiefly prevail are very moist, such being evening winds. A town so situated bears a strong resemblance to autumn in the changes which take place during the day, because there is a great difference between early morning and the later part of the day.

[Further particulars regarding waters.]

(7) I wish now to give an account of the other kinds of waters, both the unhealthy and the most health-giving kinds;

also to consider what good and bad results tend to be produced by water, since this has the greatest possible effect on health. The stagnant waters, then, of marshes or ponds are in summer necessarily warm, thick, and strong-smelling, since they have no outflow, but, being constantly supplied with fresh rain-water, and being heated by the sun, must needs lose their sparkle and become unwholesome and produce bile. In winter, again, they are cold, and turbid by reason of the snow and ice, so that they have a great tendency to cause phlegm and sore throats. In those who drink them the spleen is always large and obstructed, the stomach hard, thin, and hot, the shoulders, clavicles, and face emaciated; for the flesh melts away into the spleen, and this is why these people are thin. They are also given to eating and drinking, and their alimentary canals, both upper and lower, are rendered very dry, so that they need stronger medicaments. This disease is common with them both in summer and winter. In addition to these there are a great many cases of very fatal dropsy; for in summer much dysentery, diarrhœa, and long-continued quartan fever occur, and these maladies, when protracted, dispose such constitutions to dropsy, with a fatal ending. These then are the summer diseases; in winter the younger people suffer from pneumonias and conditions causing delirium, while the older people suffer from ardent fevers (*causi*: cf. p. 72) owing to the hardness of their bowels. The women have œdemas and leucophlegmasia; they are slow to conceive, and have difficult labours; the fœtus is large and swollen, and later, during nursing, becomes wasted and sickly; the mother's lochial discharge does not come away satisfactorily after parturition. Among the children, hernia is very common. The men have varicose veins and ulcers on their legs. Hence people with such constitutions cannot possibly be long-lived; they grow old before their time. Again, the women appear to be pregnant, and then, when time for delivery arrives, the abdominal swelling disappears; this comes from dropsy of the uterus.

Such waters as these I consider bad for every purpose, and next to these are waters issuing from rocks, for they must needs be hard; or from earth where the waters are warm, or where there is iron, copper, gold, silver, sulphur, alum, bitumen, or soda; these are all produced by extreme heat. It is impossible for water from such a soil to be good; it must of necessity be hard and heating, difficult to pass by the urine, checking defæcation. The best waters are such as flow

from elevated situations and earthy hills; these are sweet and clear, and can bear little wine. In winter they become warm, and in summer cold, which proves that they come from very deep wells. I am particularly in favour of those whose streams break forth in the direction of the rising sun, and especially the summer rising; these will of necessity be clearer, as well as fragrant and light. But all those that are saltish, obdurate, and hard are not good for drinking. There are, however, some natures and diseases in which these waters are suitable to drink, and about which I shall presently speak.

The following also holds good of spring waters: those whose sources face the risings of the sun are the very best; second come those between the summer risings and summer settings, and especially those nearer the rising; and thirdly those between the summer and winter settings; worst are those facing southward, and those between the winter risings and settings; they are very bad indeed with a south wind, better with a north.

These waters are conveniently used as follows:—A healthy strong man need not discriminate, but may always drink what comes to hand. But whoever has an illness and wishes to drink the most suitable water will best attain health by doing as follows. If the digestive organs are hard and prone to heat up, the waters suitable are those most sweet, light, and sparkling. Where the bowels are soft, lax, and tending to phlegm, the hardest and most intractable waters, somewhat saltish, are indicated; since these have the strongest drying tendency. For such waters as are soft and best for boiling are also most inclined to loosen and relax the bowels, whereas those that are resistant, hard, and least suitable for boiling have the greatest binding and drying effect on the bowels. Indeed people are, through inexperience, mistaken about saline waters, thinking that these are laxative, whereas they are the very reverse; they are intractable and unsuited for boiling, and thus also the bowels are bound up by them rather than relaxed.

(8) I shall now give the facts as regards water from rain and snow. Rain waters are the lightest, sweetest, finest, and brightest; for the sun first attracts and draws up the finest and lightest part of the water; this is proved by salt deposits, for the saline part of the water is left behind, owing to its coarseness and weight, and forms salt; whereas the thinnest

part, by reason of its lightness, is drawn up by the sun; moreover, such is attracted not only from pond waters, but from those of the sea, and from wherever any moisture is present. And it is present in everything; even from man himself the sun attracts the thinnest and lightest portion of his humours. The clearest proof of this is that when a man walks or sits in the sun, wearing his cloak, there is no sweat on those parts of him where the sun strikes, since this abstracts the sweat as it emerges; on those parts, however, which are covered by his cloak or anything else, sweat appears; for while it is perforce drawn out of him by the sun, it is at the same time preserved by the covering from being dissipated by the sun. And when he goes into shadow, his whole body sweats alike, since the sun no longer shines on it.

Hence also of all waters rain water putrefies soonest, and has a bad smell; for being a mixture compounded of very many elements mingled together, it therefore becomes soonest foul. And furthermore, when it has been drawn up aloft and carried about and mingled in the air, the turbid, dark portion of it is separated, changes, and becomes vapour and mist, while the clearest and lightest part is left behind and becomes sweetened through the burning, concoctive action of the sun (just as all other things also are rendered sweet by coction). Now, so long as it is dispersed and not yet condensed, it is carried about aloft; but when a sudden clash of contrary winds collects and compresses it at one point, then it bursts wherever most compression happens to be; for this is most likely to happen when the clouds are set in motion and, driven along by a steadily blowing wind, come suddenly into collision with an adverse current of air and other clouds: then the front becomes compressed, the rear parts move forward and so become thick and dark and compressed at one point; the weight then causes a rupture, and rain results.

The rain waters, then, it would appear, are the best. But they need to be boiled in order to lose their impurities; otherwise they have a bad odour and cause sore throats, cough, and hoarseness in those who drink them.

Waters from snow and ice, on the other hand, are all bad; when once water freezes, it never returns to its original state, but the bright, light, and sweet part of it is separated out and disappears, while the most turbid and heavy part remains. You may know this in the following way. When it is winter, pour water by measure into a vessel, and put it in the open

air, where it will best freeze; then on the next day bring it under cover, so that the ice may thaw most quickly; then, when it is dissolved, weigh the water again. You will find it considerably diminished. This proves that freezing disperses and dries up the lightest and finest portion, and not the heaviest and coarsest; the latter is impossible. In this way, then, I consider these waters from snow and ice and such as are allied to them to be the most harmful for all purposes.

(9) Men suffer from stone, kidney-disease, strangury, sciatica, and rupture when they drink waters of many various kinds, or water from large rivers into which other rivers run, or from lakes fed by many streams of different kinds; or if they use water which has been led from a great distance and not from the locality. For no one water can resemble another; some are sweet, others salt and aluminous; others flow from warm springs; when these are all mixed up together they disagree, and the strongest always prevails. Yet the same is not always the strongest, but it varies in one direction or another according to the winds; for one water gets its strength from the north wind, another from the south, and so with all the rest. In these cases a deposit of mud and sand necessarily forms in the vessels, and it is from these waters, when imbibed, that the above-mentioned ailments arise.

. . . . . .

[The seasons; dangers of sudden changes.]

(10) As regards the seasons, anyone wishing to judge whether the year is going to prove unhealthy or healthy must take the following things into consideration. If signs are normal during the rising and setting of the stars, if there be rains in autumn, if the winter be moderate, neither too mild nor unseasonably cold, and if seasonable rains occur in spring, and again in summer, the year is likely to turn out very healthy. But if the winter be dry, with northerly winds, and the spring rainy, with southerly winds, the summer is certain to be of an inflammatory type, bringing about ophthalmias and dysenteries. For when stifling heat sets in suddenly, the earth being moist from the spring rains and south wind, the heat is necessarily doubled from the burning sun and the soaked warm earth; at the same time men's bowels not being braced, nor their brains clear of humours—for it would have been impossible after such a spring for the body and flesh to be anything but moist—very acute fevers occur in all cases,

but especially among the phlegmatic [inflammatory]; also dysenteries tend to occur in women and those of a very moist constitution. And if at the time of the Dog Star's rising wet wintry weather supervenes, and the Etesian winds blow, it may be expected that these maladies will cease, and that the autumn will be healthy. Otherwise there is a danger that children and women will die (not so much, however, old men), whilst those that get well may pass into quartan ague, and from that into dropsy. . . . And if the summer is dry, these maladies come more quickly to an end; but if it is rainy they last a long time and there is a danger of wounds becoming serious ulcers from the slightest cause. Also lienteries and dropsies supervene at the end of these diseases, since the bowels do not easily dry up.

But if the summer is rainy, with southerly winds, and the autumn similar, the winter is bound to be unhealthy, and there is a tendency for ardent fevers (*causi*) to occur in phlegmatics and in people above forty years of age, also for pleurisies and pneumonias in those biliously inclined. And if the summer is dry and northerly, and the autumn rainy and southerly, headaches and sphaceli of the brain [? cerebral convulsions] are likely, as also bronchial affections, coryzas and coughs; in some cases also phthisis. And if the weather be northerly and dry, without rain during the period of the Dog Star or in Arcturus, this agrees best with those of a phlegmatic and those of a moist constitution, and with women; on the other hand, it is most inimical to the bilious, for these become too much dried up, and suffer from dry ophthalmias and acute, long-continued fevers; in some cases also from melancholy, for the most watery and moist part of the bile becomes dried up and dispersed, while the thickest and most acrid is left behind; and similarly with the blood. Such is the origin of these diseases. To phlegmatics, on the other hand, these conditions are all beneficial, for their bodies are thereby dried up, and they arrive at winter not in a state of flabbiness but of dryness.

(11) By considering and observing in this way one may foresee most of the effects which will result from the changes. And it is particularly against the greatest changes of the seasons that one must be on one's guard, and one must not give physic unless forced, nor burn nor practise incision in the region of the belly until ten days or more are past. Now, the greatest and most dangerous changes are the following

four: the two solstices, especially that of summer, and the two equinoxes, especially that of autumn. One must also pay heed to the risings of the stars, especially the Dog Star, and, after that, Arcturus, as also the setting of the Pleiades; for it is especially on these days that diseases have their crises; some prove fatal, others pass off, while all the rest change into another form and constitution.

[Effects of climate on national characteristics.]

(12) I wish now to consider Asia and Europe, and to show how they differ in every way, and how unlike their tribes are physically from each other. It would indeed be a long story to speak about all of them, but I shall relate what seem to me the greatest and most marked differences. I maintain that Asia differs very greatly from Europe in the nature not only of all things that spring from its soil, but also in the nature of its inhabitants. For everything produced in Asia is more beautiful and of greater size; the country is kinder and the character of the inhabitants milder and more gentle. The reason for this is the blending of the seasons, for Asia is situated towards the east, midway between the sun's risings and further removed than Europe from the cold. Growth and moderation of temperament are best fostered when the climate shows no predominant quality, but a general equilibrium prevails. Yet it is not everywhere the same throughout Asia, but that part of the country which lies between hot and cold has the finest fruits and trees and the most equable climate, and enjoys the purest waters, both from earth and heaven. For it is not too much scorched by heat, nor dried up by droughts and want of water; nor is it oppressed by cold; nor wet and soaked by excessive rain and snow. There the harvests tend to be abundant, whether sprung from seed or yielded up by the earth herself, of which men use the fruits, rendering the wild tame, and transplanting it into a suitable soil. The cattle too bred there incline to be vigorous, and especially to bring forth numerous progeny and to rear them excellently.

The inhabitants are usually well-nourished, most comely to look on, of great size, and differing little from one another in form and stature. And this region tends to be likest to springtime, both in its character and in the equableness of its seasons. But under such conditions manliness and long-suffering, industry, and moral energy could not arise, either

among native born or immigrants; here pleasure necessarily prevails.

(13) As regards those dwelling on the right of the summer risings of the sun as far as Lake Maeotis [Sea of Azov]—this being the boundary between Europe and Asia—the following may be said. These races differ more from each other than do those already spoken of, this being due to the changes of the seasons and the nature of the country. And land is affected exactly as mankind in general is affected. For where the seasons show the greatest and most frequent variations (*metabolæ*),[1] there the country also is wilder and more irregular, and you will find the greatest variety of mountains, forests, plains, and meadows. But where the seasons do not differ greatly, there the country is most even. And of the inhabitants also the same holds, if anyone cares to consider this. Some of them are naturally like to wooded and well-watered mountains, some to thin unwatered soil, others to fenny and marshy places, and yet others to a plain of bare, dry land. For the seasons which change the natural form of men's bodies are various; if they differ greatly from each other, yet greater differences occur in men's shapes.

(14) I will omit all those peoples that differ little from each other, but will describe how matters stand regarding those differing greatly either through nature or custom. To deal first with the Macrocephali [Longheads]. There is no other race that has heads at all like theirs. At first, usage was the chief cause of the length of their heads, but now nature co-operates with usage. For they think those most noble who have the longest heads. The following is their ordinary practice. As soon as a child is born, its body being tender, they take its head while it is yet soft and mould it with their hands, forcing it out lengthwise, and they apply bandages and suitable appliances, whereby the spherical form of the head is destroyed and the length increased. In the beginning, custom so operated that this constitution of the head was produced by force; as time went on, however, this became natural, custom being no longer the determining factor. For the semen comes from all parts of the body, being healthy from the healthy parts, and diseased from the diseased. If then, in general, parents who are bald gave birth to bald children, blue-eyed parents to blue-eyed children, cross-eyed

[1] "The four changes at the end of the four seasons were only the most important of many μεταβολαι" (Jones).

parents to squinting children, and similarly for the rest of the body, what then prevents a long-headed child being born of a long-headed parent? At the present day, however, this does not happen as formerly; for the custom no longer prevails, owing to intercourse of the Macrocephali with other peoples.

(15) Next, as regards the dwellers on the Phasis. Their country is marshy, warm, damp, and wooded. Much heavy rain falls there at all seasons. The inhabitants pass their lives in the marshes; their houses, of wood and reeds, are built in the water. They practise walking little, either in town or the market, but they sail up and down in canoes hollowed out of tree-trunks, for there are many canals. They drink warm, stagnant water, which has been corrupted by the sun and swollen by the rains. The River Phasis itself is the most stagnant and slow-flowing of all rivers. All fruits which grow there are feeble, swollen, and imperfect, owing to the redundance of water; on this account also they do not ripen. Moreover, a great deal of mist coming from the waters overspreads the country. For these reasons the natives of Phasis are in appearance unlike other men; they are large in size and of excessive stoutness; none of their joints or veins are visible; the colour of their skins is olive, as though they were jaundiced. Their voices are deeper than those of any others, since they breathe an air which is not clear, but misty and humid. By nature they are somewhat disinclined for physical fatigue. The seasons do not vary much in the direction either of great heat or cold. The winds are chiefly moist, except for one peculiar to the country; this sometimes blows violently and is hot and disagreeable; they call it *cenchron*. There is not much north wind; when it does come it is weak and gentle.

[Asiatics.]

(16) As for the lack of spirit and fortitude shown by the inhabitants, the fact that Asiatics are less warlike than Europeans and milder in their manners is mainly due to the seasons, for these do not undergo any great changes in the direction either of heat or cold, but are equable. Hence neither is the mind subjected to shocks nor the body to any violent constitutional change, which are more likely than is monotony to roughen the temper and make it inconsiderate and impulsive. For it is *changes* above all things which

stimulate men's minds and prevent them from stagnating. For these reasons, it seems to me, the Asiatic race is a weak one, and also owing to its institutions. For the greatest part of Asia is ruled over by kings, and where men are not their own masters and independent, but are under despots, they do not concern themselves with how to make ready for war, but how to appear ineligible for fighting. For the dangers are not equally shared; as a rule, the subjects are forced to fight, and to endure hardship and death on the despot's behalf, far from their wives and children and other friends; and all the worthy brave deeds they do merely serve to let their masters grow and prosper, while they themselves reap danger and death. Further, the land of these men is bound to become desolate by wars and unemployment. Hence even though one be born with a nature valiant and high-spirited, his temper is necessarily perverted by institutions. A clear proof of this is the fact that all Greeks and barbarians in Asia who are not ruled by despots, but are autonomous and work for themselves, are the most warlike of men: it is for their own sakes that they endure dangers, and they themselves carry off the rewards of their prowess, or incur the punishment of their cowardice.

You will also find that the Asiatics differ from each other, some being better and some worse; the cause of this is the changes of the seasons, as I have already stated.

[Sarmatians and other Scythians.]

(17) In Europe there is a Scythian race, living round about Lake Maeotis [Sea of Azov], which differs from all other races, and is called the Sauromatae [Sarmatians]. Their women ride on horses and shoot with bows and spears from horseback, and fight with their enemies as long as they are virgins. They do not abandon the state of virginity until they have killed three foes; nor do they cohabit with men before making the traditional sacrifices. A woman who takes to herself a husband ceases to ride, unless forced by the necessity of a general expedition. These women have no right breast; for, while they are still infants, their mothers heat strongly a copper instrument, constructed for this purpose, and apply it to the right breast; thus cauterised, its growth is arrested, and its whole strength and fullness passes to the right shoulder and arm.

(18) . . . The so-called Scythian desert [now Steppes] is

an elevated, grassy plateau, moderately well watered; its rivers being large and discharging the water from the plains. Here too dwell the Scythians, who are called Nomads [lit. "pastoralists"] because they have no houses but live in waggons. Of these waggons the very smallest have four wheels, others six; they are covered over with felt and arranged like houses, some with two apartments, and others with three; they are secure against water, snow, and wind. These waggons are drawn by teams, some of two, others of three, hornless oxen; they lack horns owing to the cold. In the waggons live the women, while the men themselves ride on horseback; following them come the sheep, oxen, and horses. They remain on the same spot as long as there is fodder sufficient for their animals; when that fails, they migrate to another district. They themselves eat boiled meat and drink the milk of mares; they have also a food called *hippaké*, which is cheese made from mare's milk.

(19) We now deal with the seasons, and with the physical appearance of the inhabitants. The Scythians are very different from other people, but, like the Egyptians, they all resemble each other. Moreover, they are not at all prolific, and their country breeds the smallest and fewest wild animals. For it lies immediately below the Great Bear and the Rhipean Mountains, from whence blows the north wind. The sun comes near them only at the end of its course, when it reaches the summer solstice; it then brings a little warmth for a short time. Winds coming from warm regions reach them but seldom, and with little force; whereas those from the north are always blowing; and these are chilled by snow and ice and abundant waters, from which the mountains are never free, and by reason of which they are rendered uninhabitable. During daytime the plains are in the grip of abundant fog, and here these people pass their days. Thus there is constant winter, a summer of only a few days, and that of little warmth. For the plains are high-lying and bare, and are not girdled with mountains, though they slope from the north. Here also animals do not grow to a large size, but are such as can take shelter underground; for they are hampered by the wintry weather and the bareness of the land, where they have no warmth or shelter. And the changes of the seasons are not great or strongly marked, the seasons being alike and altering little. Hence also the forms of the inhabitants are alike; they always use the same food,

and they dress in identical clothing both summer and winter, drawing in the thick, damp air, drinking water from snow and ice, and refraining from laborious toil; for neither bodily nor mental endurance can show themselves where there are no strongly-marked changes. Owing to these causes they are stout and fleshy in appearance; they have ill-marked joints, and are flabby and lacking in tone; their lower alimentary canals are moist beyond the ordinary. For it is impossible for the bowels to dry up in such a country and under such climatic conditions, but by reason of their fat and the bareness of their bodies, they are all similar to one another, males to males and females to females. For, owing to the similarity of the seasons, no corruption or deterioration takes place in the semen during its organisation, unless it be affected by some violence or disease.

(20) I will give a strong proof of their softness. You will find that most of the Scythians, or at least all of the Nomads, have marks of burning on their shoulders, arms, and wrists, on their breasts, hip-joints, and loins, and this for no other reason than the humidity and flabbiness of their constitution. For, owing to this moistness and want of tone, they are not able to draw their bows, nor launch the javelin from their shoulders; but when they use the cautery, most of the moisture is dried up from the joints, and their bodies become better braced, nourished, and articulated. Their bodies grow flabby and squat, first because, unlike the Egyptians, they do not swaddle themselves up, since they study to be good horseback riders; and secondly owing to their sedentary lives; for the boys, until they are able to ride, sit mostly in the waggons and walk very little, because of their frequent migrations and removals; and as to the females, they are extraordinarily soft and torpid in appearance. In complexion the Scythian race is high-coloured ("pyrrhous"); this is owing to the cold, since the sun's heat is not intense; the white skin is parched with the cold, and so becomes tanned.

(21) With such a constitution they cannot be a prolific race. The male has little desire for sexual connection, owing to the moistness of his nature and the softness and coldness of his viscera; which conditions are the main impediment to venery. Moreover, the constant jolting on their horses makes them weak in sexual desire. These are the causes which operate on the men. In women it is the fatness and humidity of their flesh; the uterus is unable to catch up the semen,

since the monthly cleansing process does not take place in proper fashion, but is scanty and of short duration; further, the mouth of the uterus, being occluded with fat, cannot admit the seminal fluid. The women personally are fat and indolent, and their internal cavities cold and soft.

These then are the reasons why the Scythian race is necessarily infertile. An important proof of this is furnished by their female servants; for no sooner do these have intercourse with a man than they become pregnant, this being due to their lives of hard toil and to the spareness of their frames.

(22) Moreover, the greatest number of *eunuchs* are to be found in Scythia. These perform women's work, spend their time like women, and speak accordingly; such people are designated unmanly ["deprived?" ἀναιρῶ]. The natives ascribe their condition to a god, and worship and adore these men, fearing the same thing may happen to themselves. My own opinion also is that these conditions, like all others, are divine, and that one thing is neither more divine nor more human than another; all are alike and all divine; everything of the kind has its own nature (*physis*), and none comes into existence without its proper nature.

And I shall say how I think this trouble originates. By riding, they acquire chronic swellings (*kedmata*), from their legs always hanging down below their horses; then their hip-joints become stiff and sore, at least in the bad cases. And they cure themselves in the following way. When the disease begins, they cut the vein behind each ear; and when the blood flows away, the resulting weakness leads to sleep. Then, on waking, some of them are cured, and some not. My view is that by this treatment the seminal fluid is destroyed; for there are certain veins beside the ears, and if these be cut the subjects of the operation become impotent; these, it appears to me, are the veins cut in this case. After this treatment, when these men go with women and are unable to have connection, they do not at first give it consideration or say anything about it. But when they have no success after two, three, or more attempts, they then imagine they must have done some evil against the god to whom they attribute their affliction; hence they put on female clothing, recognise that they are unmanned, live like women, and work with them at their work.

This is an affection of the wealthy Scythians; not of the meanest, but of the most highly born and powerful; and it

is caused by riding, and the poor have it less, as they do not ride. Now, if this disease were more divine than others, it would by rights attack not the most high-born and wealthy Scythians alone, but all alike; in fact, rather those with small possessions, who do not offer sacrifices to the gods—if indeed the gods take pleasure in the homage of men and grant them favours in return. For naturally the rich, owing to their possessions, sacrifice a great deal to the gods, dedicate to them votive offerings (*anathemata*), and worship them, whilst the poor, from having nothing, do less in this way, and even go so far as to upbraid the gods for giving them no money; hence those with small possessions are likely to pay more heavily for such offences than the rich.

But, as I said before, *these conditions are divine, like all others; each one arises according to* [*its particular*] *nature:* such is the disease from which the Scythians suffer, and its cause is as I have stated. And the same thing holds for the rest of mankind. Where there is most horseback exercise, there we find most cases of *kedmata* (chronic swelling), sciatica, and gout, and least desire for sexual gratification. These conditions are present with the Scythians, and they are the most impotent of men for the reasons I have given; another reason is that they always wear breeches, and spend most of their time on horseback, so that they do not handle their private parts, and, owing to cold and fatigue, forget all about sexual matters, and make no attempt at connection until after they have become impotent.

[*General recapitulation.*]

(24) There are in Europe also tribes differing from each other in stature, form, and valour; the differences are due to the same causes that I have already mentioned, but I shall now state them more clearly. People who live in mountainous, rough, high, and well-watered country, where there are great seasonal changes, tend to be large in stature, and naturally well fitted for hard work and manly adventure; such natures also show the wild and savage element in no small degree. Those, on the other hand, who inhabit low-lying, grassy, close localities, with a greater share of hot than of cold winds, and who drink warmish waters, are not likely to be big or well-proportioned, but tend naturally to breadth and corpulency; they are also dark-haired, and are

rather of a dark than a light complexion; they incline to phlegm rather than bile; they do not naturally possess courage and endurance to the same degree; yet the intervention of *laws* may produce these. Moreover, if there happen to be in the country rivers to carry away its stagnant waters and its rain, the inhabitants will be healthy and of clear complexion. But if there are no rivers, and the people drink from ponds or from stagnant and marshy waters, they invariably show protuberant bellies and enlarged spleens. Such as inhabit an elevated, level, well-ventilated, and well-watered country are apt to be large in stature and similar to one another, but somewhat unmanly and mild in disposition. Those who live on thin, bare, waterless soils, not well tempered to the changes of the seasons, will tend to be hard and well-braced in appearance, of a fair rather than of a dark complexion, and in their customs and tempers stubborn and opinionated. For where the changes of the seasons are most frequent and most marked, there you will find the greatest diversity in physique, in character, and in constitution.

These, then, are the greatest causes of difference in people's natures: next comes the country in which a man is reared, and the waters; for, as a rule, you will find the inhabitants' physique and mode of life agreeing with the nature of the country. Where the region is fat, soft, and well-watered, with its source of water very near the surface, so that it is warm in summer and cold in winter, and where the seasons are well-tempered, there the inhabitants also are fleshy, soft in constitution, showing little of their joints, intolerant of toil and generally base in spirit. Sluggishness and somnolency are marked in them; at the various arts they are dull, not subtle and acute. But where the country is bare, waterless, and rough, ravaged by winter's storms and scorched by the sun, there you will find the people hard, wiry, with supple joints, well-braced and shaggy; such natures show active energy and wakefulness (*agrypnia*); in character and temper they are bold and self-willed, tending to wildness rather than mildness of disposition; you will find them more acute and ingenious than others in the arts and superior in warfare. Likewise you will find all other products of the soil corresponding to the soil.

Such are the most sharply contrasted natures and physiques.

Taking these observations as a standard, you may proceed to consider the rest, and will not go wrong.

HIPPOCRATES

EPIDEMICS

(Books I and III)

Introduction.

[These two books deal with the meteorological "constitutions" of certain years, and with the types of disease which occurred during them. Three unconnected clinical histories are also quoted from Book III, to illustrate Hippocrates' succinct, clear, and business-like method of recording his cases.

A constitution (*catastasis*) practically means a kind of *disease-group* peculiar to a special year, the so-called "diseases" of that year being in a certain sense its symptoms; their relation, however, to the year's meteorological constitution is not generally clear; doubtless we are to assume that the latter acted by way of the humours; in any case our author contents himself with establishing the fact that prevalent atmospheric conditions and prevalent diseases vary together. The effect of weather conditions on health and disease is also, as we have seen, one of the main topics of "Airs, Waters, and Places."

The two most interesting constitutions treated of in the following extracts are the "phthisical" and "pestilential" so called. The latter is supposed to have been related to the great "plague" at Athens, of which the famous description by Thucydides is also given in the present volume (pp. 97). The two descriptions should be compared, and both again with the account by Diodorus of the Syracusan pestilence, added in the Appendix (p. 247); these three ancient treatises may also be usefully set alongside the description given by our "English Hippocrates" (Sydenham) of the "epidemic constitution" of the years 1661 to 1675 in London, viz. the first fifteen years of the reign of Charles II; this includes some notes on the Great Plague of 1665.

The constitution first called " pestilential " (*loimôdes*) by Galen in his commentaries on Hippocrates was thus not a single disease, but a number of pathological conditions which, according to the observation of our author, tended to be associated together at one time and under particular conditions (of weather, etc.). Among these " diseases " we may note special types, such as (1) a cerebral type, with high fever, " phrenitis," " lethargus," coma, etc.; (2) a malarial type, with regular, intermittent fever attacks; (3) a " plague " type, with buboes and carbuncles; (4) an epidemic erysipelas, often going on to suppuration and gangrene; (5) a phthisical type. These are not clear-cut entities, and tend to run into one another; for example, a well-marked malarial element may be distinguished in many of them, outside of the specially malarial group; compare also the multiform " influenza " of our own day.

Hippocrates associated malarial conditions particularly with bile. The common affection *causus*, usually translated " ardent fever," was probably a remittent tertian (Jones), perhaps more exactly what is called bilious remittent (Adams, Littré). In " phrenitis " there was delirium; in " lethargus " there was irresistible coma, a well-known manifestation of pernicious malaria. (One is inclined to ask whether our modern encephalitis lethargica, or " sleepy sickness," may not have some affiliation here.)

One or two further points worth noting are the following:— The epidemic of mumps is associated, as not infrequently to-day, with inflammation of the testicle. Coction " proceeding to suppuration " is seen to be part of Nature's method of cure. So also is a " critical " discharge of sweat or urine. Some urine, on the other hand, is " without value."

Hippocrates reckons the year as beginning with autumn— that is, at the rising of Arcturus, after the period of " Etesian " winds.

It is remarkable that our author never speaks of infection, although Thucydides, his contemporary, refers to it constantly in connection with the Athenian pestilence. Further, in the " Epidemics " Hippocrates never makes any reference to treatment; in this work he is the purely objective " scientist."

Of " Epidemics," Books I and III, Jones says that " they manifestly form one work, and that the most remarkable product of Greek science."]

Greek text: Littré, Vol. 2.

First Constitution

"Epidemics," Book I

I. In Thasus, about the time of the autumnal equinox to near the setting of the Pleiades (Sept. 21–Nov. 8), there were abundant continuous, soft rains, with southerly winds.

Winter was southerly; north winds few; droughts; on the whole winter resembled spring.

Spring southerly and cool, few showers. Summer in the main cloudy; absence of rain; Etesian [lit. "seasonal"] winds few and slight, and blew spasmodically.

While the general tendency was towards south winds and droughts, yet early in the spring, owing to the previous constitution (*catastasis*) having on the contrary been northerly, there were a few cases of ardent fever (*causus*), all very mild: a few showing hæmorrhage, but none proving fatal. Many had swellings beside the ears [mumps, *parotitis*], either on one or both sides, in most cases without fever, and not necessitating confinement to bed; some, however, were a little heated. In all cases these swellings subsided without giving trouble, and none went on to suppuration as do those from other causes. In character they were flabby, large, diffuse, without inflammation or pain; in all cases they disappeared without a sign. These conditions occurred in youths, young men, and adults; mostly in such as took exercise in the wrestling schools and gymnasia; but they seldom attacked women. Many had dry coughs without expectoration; and hoarseness in speaking. Not long after, but in some cases a considerable time later, painful inflammation occurred in one or both testicles; fever in some cases, in others not. The condition was as a rule very troublesome. In other respects they had no illnesses requiring medical attention.

An Epidemic "Phthisis."

Ibid.

II. Beginning early in the spring, throughout summer, and into winter, many people who had been for long declining took to bed in a state of consumption [lit. "phthinoid," not definitely "phthisical"], and in the large number of those in whom the signs had been ambiguous, the disease now became

confirmed. There were some also in whom the disease now first began; those being such as had constitutions inclining to the consumptive. Many, and in fact most of them, died; indeed I do not know that any of those who took to their beds survived even for a short time. They died more rapidly than is usual in such cases; as far as the other illnesses of the time, however, were concerned, even when protracted and attended with fever, these they supported well and did not die from them; we shall refer to this subject later.

Alone this consumptive condition proved fatal among all the complaints of the time.

In most cases the symptoms were as follows: shivering fevers, continuous and acute; on the whole not intermitting; semitertian in character; milder on one day, and showing an exacerbation on the next; on the whole, tending to become more acute. Sweating constant, but not over the whole body. Severe chilling of extremities, with difficulty in restoring warmth. Bowels disturbed, with stools bilious, scanty, unmixed, thin, and acrid; patients constantly rising from bed. Urine thin, colourless, unconcocted, and small in quantity, or yielding a thick, scanty sediment; not settling well, but with a crude and unnatural deposit. Expectoration of small, frequent, concocted sputa; few in number and brought up with difficulty. In those cases where the symptoms were most violent, no coction took place, but they continued spitting up crude matter. The throat in most of these cases was painful from beginning to end, and showed redness together with inflammation. Defluxions (*rheumata*) slight, thin and acrid. Patients quickly wasted and got worse; having no appetite for food throughout; not thirsty. In many, before death, the mind began to wander.

So much then for the consumptive cases [but see p. 79].

III. During summer and autumn many fevers of the continuous type, but not violent, occurred in people who had been long ill without having other troublesome symptoms; for in most of them the bowels were satisfactory and gave no trouble worth mentioning. Urine also in most cases well-coloured and clear, thin, and later on, when near the crisis, becoming concocted. Not much coughing, nor was cough troublesome. No loss of appetite; on the contrary, definite need of giving food. On the whole they did not sicken like the consumptives with shivering fevers, but with slight sweats, and the paroxysms coming irregularly. In these cases the

earliest crises took place about the twentieth day, but in most about the fortieth; and in many about the eightieth. Again, in other cases there was a different ending, the fever passing away without crisis in an irregular fashion. In most cases, after remitting for a short time, the fevers relapsed once more, and after these relapses crises occurred at the same intervals; the disease frequently continued, and was still present by winter.

Of all those described in this *constitution*, it was only the consumptive cases that proved fatal; all the others did well, and in the other fevers there were no deaths.

Fourth Constitution

"*The Pestilential*"

"Epidemics," Book III

[Compare descriptions of Plague, by Thucydides and Diodorus Siculus (pp. 97, 245).]

Year southerly and rainy; no winds (*apnœa*) throughout. While there had been droughts immediately before, about the rising of Arcturus there was much rain, with southerly winds. Autumn gloomy and cloudy, with abundance of rain. Winter southerly, moist and soft after the solstice. Much later, near the equinox, return of bad weather; at the equinox itself northerly, snowy weather, though not for long. Spring again southerly, without winds; much rain throughout until the Dog Star. Summer fine and warm; stifling heat-waves. Etesian winds blew feebly and irregularly. Again at the rising of Arcturus much rain, with north winds.

The year having been southerly, humid, and soft, in winter the general health was good, apart from cases of consumption, which will be dealt with later.

III. Early in spring, together with the cold spells, occurred many cases of erysipelas, sometimes with and sometimes without a cause, malignant in nature, fatal in many cases. Many had pain in the throat; some had loss of speech; there were cases of ardent fever (*causus*), phrenitis; aphthous ulcers in mouth; growths (*phymata*) on the privy parts; ophthalmias; carbuncles; bowels irregular; loss of appetite, some thirsty,

some not; urine disordered, abundant, bad. Some people became comatose for a long time, and then again sleepless; many cases of failure of crisis, or of obscure crisis; dropsy; much consumption.

These then were the diseases endemic; patients belonged to each of the types mentioned, and many died; the symptoms in each type were the following.

IV. Often erysipelas developed all over the body as the result of any chance wound, even a very small one; this was especially in people of about sixty years of age, and affected particularly the head if it was in the slightest degree neglected. In many patients also who were undergoing treatment, extensive inflammations would occur, and the erysipelas would spread with great rapidity in every direction. In most of these cases the inflammation proceeded to suppuration, and there was great sloughing of flesh, sinew, and bone. Moreover, the discharge which occurred was not like pus, but another kind of putrefaction, discharging abundant matter of varied character. Where any of these symptoms occurred about the head, there was complete loss of hair on head and chin, the bones were laid bare and sloughed away, again with abundant discharge. Some of these cases showed fever, and some did not. They were alarming to look at, rather than dangerous; for where coction proceeded to pus-formation or the like, the majority recovered. On the other hand, in most of those cases where the inflammation and pus went away, or no such abscess formed, death resulted. And similarly into whatever other part of the body the disease wandered, the same symptoms occurred. Thus in many cases there was complete loss of both the upper and lower arm; and where the sides were attacked, a malignant condition supervened, either in front or behind; in other cases, it was the whole thigh which was laid bare; or the region of the shin, or the whole foot. Of all these cases the very worst were those where the malady attacked the pubic and genital regions.

Such then were the cases of ulceration where an exciting cause existed. But ulcers also developed in many cases in association with fevers, both before and after them. In such of these cases, again, as came to a head by abscess-formation, or where a timeous disturbance of the bowels occurred, or a discharge of healthy urine, resolution was brought about; but where none of these symptoms occurred and the condition disappeared without giving a sign, it proved fatal. By far the

larger number of the cases of erysipelas showed themselves in the spring; they also, however, continued throughout summer and during autumn.

VI. Now the cases of ardent fever (*causus*) and *phrenitis* began early in the spring, after the cold spells which had occurred, and great numbers fell ill at that time; these cases were attended with acute and fatal symptoms. The constitution (*catastasis*) of the ardent fevers was as follows: at first coma, nausea, shivering, fever not acute, not overmuch thirst; no mental disturbance, slight bleeding from the nose. The paroxysms in most cases were on the even days; about the time of the paroxysms there was loss of memory, prostration, and loss of speech. In these cases the extremities of hands and feet were colder than usual, and far most commonly about the times of the paroxysms; heat was recovered, and again slowly and imperfectly, and once more they became rational and conversed. The coma was persistent and they had no proper sleep, or else they had insomnia, accompanied by pains [coma vigil]. In most of these cases the bowels were disturbed, with crude, thin, and copious motions; urine was plentiful, thin, and lacking in any critical or useful quality; nor was there any other critical sign in those so affected; there was neither any satisfactory hæmorrhage nor any of the other ordinary critical discharges. They died each in a different way; in most the manner of dying was irregular, generally about the crises, some after having lost their voices for a long time, many in a sweat. These were the symptoms in the fatal cases, and the same appeared in those of phrenitis. These had no thirst at all, nor had any of them the wild delirium that marked the other cases; it was in a different kind of dull stupor that they died.

VII. And there were also other fevers, as will be described. In many cases mouths had aphthæ or ulcers. Discharges about the genitals were frequent, ulcerations, growths outside and in, about the groins [buboes of plague?]. Dry long-standing ophthalmias, with pain. Growths on the eyelids, outside and in, often destroying the sight; these are called "figs." Growths were also common on the other ulcers, and on the genitals. Carbuncles common in summer, also other conditions known as "putrefaction" (*sêps*). Large ecthymata. Extensive herpes in many cases.

VIII. The bowel troubles in many cases were numerous

and harmful. Firstly, painful tenesmus was frequent—mostly in children, and those near puberty—and most of these died. Many cases of lientery. Dysenteries, these also not very painful. Stools bilious, greasy, thin, and watery. In many cases this constituted the disease itself, with or without fever. Painful colic and malignant griping. Evacuations, with retention of most of the contents: evacuations not stopping the pain, but yielding with difficulty to the means administered; indeed the purgings actually did harm in most cases. Many of those in this condition died rapidly, but some held out for a considerable time. Speaking generally, all patients, whether with the chronic or the acute disease, died mainly from the bowel conditions; it was the bowels that carried them all off.

IX. In all of the above-mentioned complaints also there was an aversion to food such as I have never before met with, and especially in such of those, and of the other cases, as were fatally stricken. Some had thirst, and others not, and of the febrile cases and the others, no one drank unseasonably, but in this respect you could treat them as you pleased.

X. Abundant urine was passed, not in proportion to the amount of fluid drunk, but greatly in excess. Its bad quality was also very marked; for it had not the proper thickness, nor coction, nor cleansing properties; in most cases it indicated a wasting of the body, disordered bowels, pain, and absence of crisis.

XI. The cases of ardent fever and phrenitis tended in the main towards coma, but this was also marked in all the other serious diseases which were accompanied by fever. In most cases there was either heavy coma throughout, or short snatches of light sleep.

XII. Many other kinds of fever were also epidemic—tertians, quartans, fevers of nocturnal, continuous, protracted, or irregular type, with nausea, or of unsettled character. All these were accompanied by much disorder, the bowels being mostly disturbed, and rigors accompanying. There were sweats which were not of a critical character, and the urine was as described. In most instances the disease was protracted, since the abscessions which occurred did not have a "critical" effect as in other cases. Thus all had either difficult crises or none at all, and were long-drawn-out, and most especially in these last. In a few there was a crisis about the eightieth day, but in most the disease departed in hap-

hazard fashion. A few of them died of dropsy without having previously taken to bed. Many of the other troubles were complicated with swelling (*œdema*), and especially the consumptive cases.

XIII. The most widespread and severe disease [of this " constitution "], and that which proved fatal to the greatest number, was *the consumption*. Of the many cases which began in winter, a large number took to bed, while others continued going about. Of those who took to bed, most died early in the spring; of the others none got free of the cough, although this became milder in summer. During autumn all took to their beds, and many died. In most of these cases the disease was protracted. In the majority it began suddenly with frequent shiverings, often continuous; high fever; unseasonable, abundant, cold sweats throughout; frequent chills, with difficulty in recovery of heat; various degrees of constipation of bowels, then again becoming rapidly loose; towards the end, excessively loose in all cases. A downward tendency of all matters about the lungs.

Abundance of urine without value; pronounced loss of flesh; coughing continued throughout, and much moist concocted matter was coughed up, without much pain; even when there was pain, matter from the lungs was in all cases easily evacuated. Throat did not smart greatly, nor was it irritated with salt humours. There was, however, considerable discharge of viscid and white or moist and frothy matter from the head. Far the most serious symptom attending both these and the other cases was the loss of appetite, as has been mentioned. Nor did they wish to drink with their food, but remained persistently without thirst. Feeling of weight in body. Tendency to coma. In most cases swelling (*œdema*) which even went on to dropsy. Rigors. Delirium towards the end.

XIV. The physical characteristics of the consumptives were: smooth skin, whitish, lentil-coloured or reddish hue; bright eyes; leucophlegmatic [chlorotic?] complexion; wing-like shoulder-blades. Women the same.

As to the melancholic and sanguine, they were subject to ardent fevers, phrenitis, and dysenteric conditions. Young people of phlegmatic type suffered from tenesmus, and people of the bilious type from persistent diarrhœa or acrid fatty stools.

XV. In all the cases described, spring was the most difficult

and fatal season; summer was the most favourable, the fewest deaths occurring then. In autumn and during the season of the Pleiades, again, there were deaths, usually on the fourth day. It seems natural that the advent of summer should have proved beneficial; for when winter comes it drives away the summer ailments, and the arrival of summer displaces those of winter. And yet the summer in question was not in itself well constituted: in fact it became suddenly hot, southerly, and airless; nevertheless it proved helpful by changing to the other constitution.

XVI. I hold that the study also of facts committed to writing is a great part of the art of medicine; he who knows these and makes use of them is not, I think, likely to go far astray in his practice. One must also learn thoroughly the constitution of each of the seasons as well as the disease; what of good or what of bad there is common to the constitution or to the disease; what disease is protracted and fatal, and what, though protracted, tends to recovery; what is acute and fatal; what acute and curable. From these one will have success in investigating the order of the critical days and in prognosticating therefrom accordingly. With these facts in mind one can tell who is to be treated, as also when and how.

Clinical Notes of Three Cases

("Epidemics," Book I, Cases II, III, and IV.)

Case II

Silenus lived on the Broadway near the premises of Eualcidas. In consequence of exertion, drinking, and unseasonable exercises, he was seized with fever. Pain began in the loins. Feeling of weight in head, and stiffness of neck. On first day discharge from bowel was bilious, unmixed, frothy, high-coloured, and abundant. Urine dark, with dark sediment. Thirst, dry tongue. No sleep at night.

Second day. Acute fever, stools more abundant, thinner and frothy; urine dark; bad night; slight delirium.

Third day. All symptoms exaggerated. In abdomen on both sides an oblong area of tension without anything solid below it, and reaching to navel. Stools thin, darkish. Urine turbid, darkish. No sleep at night; much talking, laughing, singing; unable to check himself.

Fourth day. Same.

Fifth day. Stools unmixed, bilious, smooth, fatty; urine thin, transparent; mind occasionally clear.

Sixth day. Sweated a little about the head; extremities cold and livid; much restlessness, no passage from bowels; urine suppressed; acute fever.

Seventh day. Speechless; extremities could not be warmed up; no urine passed.

Eighth day. Cold sweat all over; and with it red spots (*exanthemata*), round, small, like acne, persisted without subsiding. From bowels after slight stimulus abundant, thin, and as it were unconcocted matter was passed, with pain. Urine irritating and passed with pain. Extremities showed little warmth. Scanty sleep; tendency to coma; speechless; urine thin and transparent.

Ninth day. Same as before.

Tenth day. Drank nothing; comatose; scanty sleep. Discharges from bowel as before; urine thickish, coming away in bulk; on standing, left a white deposit, like meal. Extremities again cold.

Eleventh day. Death.

In this case, from the beginning and throughout, the breathing was deep and infrequent. Constant throbbing in abdomen. Age about twenty.

Case III

Herophon had acute fever; stools at first scanty and with griping, afterwards thin, bilious, and somewhat frequent; no sleep; urine dark and thin.

Fifth day. In morning, deafness, all symptoms increased; spleen swollen; tension of abdomen; scanty dark discharge from bowels; mind wandering.

Sixth day. Delirious; at night sweating and chilliness: delirium continued.

Seventh day. Cold all over; thirsty; delirious. At night intelligence returned; slept.

Eighth day. Fevered; spleen became smaller. Quite rational. Pain first in the groin, on same side as spleen; then pains in both legs. Night comfortable; urine better coloured, and with slight deposit.

Ninth day. He sweated, had a crisis, and the fever intermitted.

Tenth day. Spleen at once became enlarged; acute fever. Deafness returned.

On third day after relapse, spleen became smaller and deafness less marked; legs painful. He sweated at night and had a crisis on seventeenth day. No delirium during the relapse.

Case IV. [Case of *Puerperal Fever.*]

In Thasus, the wife of Philinus gave birth to a daughter; the lochial discharge was normal, and everything else was proceeding quietly, when, on the fourteenth day after delivery, she became feverish and had a rigor. There was pain at first in cardiac region of stomach and right abdomen. Pains in genital organs. Lochial discharge stopped. On the application of a pessary these symptoms were alleviated, but pains continued in the head, neck, and loins. No sleep; extremities cold; thirst. Bowels in an overheated condition; scanty stools. Urine thin, and at first colourless.

Sixth day. At night she was very delirious; then came to once more.

Seventh day. Thirsty; stools scanty, bilious, high-coloured.

Eighth day. Had a rigor; acute fever; many painful spasms; very delirious. On application of a suppository, she rose to stool, and had a copious motion, with bilious flux. No sleep.

Ninth day. Convulsions.

Tenth day. Mind slightly clearer again.

Eleventh day. Slept; complete return of memory, but mind soon wandered again. She passed a large quantity of urine, accompanied by convulsions—her attendants seldom reminding her; this was thick and white, such as one sees when urine with sediment is shaken; but after standing for a long time it formed no sediment: in colour and consistence it resembled the urine of cattle. Such then was the urine which she passed, as I myself saw.

On the fourteenth day there was twitching all over the body; much rambling talk; a short lucid interval, then quickly delirium again. On the seventeenth day she became speechless, and on the twentieth she died.

HIPPOCRATES

PROGNOSTIC

Introduction

[In the "Prognostic" we have the Father of Medicine in a very characteristic vein. Here he stresses continuity in time, as in the "Airs, Waters, and Places" he does continuity in space. Here, in consonance with the tradition of the school of Cos, and in contradistinction to that of Cnidus, we have prognosis given a much higher place than diagnosis. That is to say, Hippocrates saw little value in merely taking a "transverse section" through a disease-process and giving a name to the result. It was the process itself—in its past, present, and future—which interested him. He saw each disease as a "natural" series of events, having a definite natural history, and tending, *cæteris paribus*, towards a definite end. Experience taught him that by observing certain *signs* in the earlier part of a disease, one could prognosticate, within limits, what the natural outcome of that disease would be. The "Prognostic," therefore, may also be called a treatise on Semeiology —in other words, on the practical significance of signs or *semeia*—what are to-day rather loosely spoken of as "symptoms." Francis Adams compares it with ancient works on weather-forecasting, such as those of Aratus and Theophrastus.

The art of medical prognosis had its most striking application in connection with acute fevers, especially those of malarial origin, each of which runs a fairly definite course and ends approximately on a fixed day. The "Prognostic" deals with such acute fevers, including their more chronic sequelæ, such as dropsy, empyemas, affections of the spleen, and so forth.

As regards the origins of the material used by Hippocrates in this work: it bears the imprint of being mainly derived from his own experience, but at the same time he almost certainly also employed material collected by his predecessors, and notably by the physicians or priest-physicians of the Asclepieum or Health-Temple of Cos. Among such material

was a collection of isolated observations known as the " Coan Forecasts " (in Latin " Coacæ Prænotiones "), and it was these and similar collections which Hippocrates elaborated and crystallised into scientific form in the " Prognostic."

A detailed synopsis of the argument is hardly needed to elucidate the following extracts. Our author begins by pointing out (Chap. I) that the physician who can forecast the natural course of a disease will not only gain in reputation, but will be better able to treat the disease. He then proceeds (Chap. II) to describe those signs which are of dangerous import. Here is included the so-called " facies hippocratica," the famous description of the countenance of a dying man. In Chaps. III, IV, and V he deals with the significance of the patient's position in bed, the movements of his hands, the nature of his respiration, etc. Chap. VII treats of abdominal symptoms, X of sleep, XII of the urine, XIV of the expectoration, XVII of gatherings of pus in the lungs, XXI of headaches, XXII of earache, XXIII of acute conditions of the throat. Chap. XXIV is a general summing-up.

In " Prognostic," as in " Epidemics " and other treatises where specific clinical pictures are presented, it is noteworthy how often a fatal ending is either described or predicted. Asclepiades, the medical iconoclast and renovator of the first century B.C., found great fault with Hippocrates for this, and stigmatised his system as nothing better than a " preoccupation with death " (θανάτου μελέτη). Certainly the narration of such cases, while witnessing to the transparent honesty of our author, yet tend to put his system in a somewhat false perspective. For he had implicit faith in the *vis medicatrix naturæ*, and knew that, in nine out of ten of these battles between Organism and Environment which constitute (or are accompanied by) " dis-ease," the Organism sooner or later emerges the victor.]

Greek text: Littré, Vol. 2.

I. It is in my opinion a most excellent thing for the physician to practise forecasting. For, by discovering and announcing independently in front of his patients, their present condition, the events that have led up to it, and those that are going to follow, also by pointing out what the patient has omitted to state, he [the physician] will gain an enhanced reputation for understanding illness, and so men will be ready to entrust themselves to him. Treatment also will be

best carried out by him if he already knows what course the existing malady is going to take.

For it is impossible to make all sick people well—that would indeed be still better than foretelling the course of their illness. But men do, as a matter of fact, die; some through the severity of their disease, before the doctor is called in; others expire even after he has been called in—some immediately, some living on for a day, others a little longer, before the physician can bring his art to bear on the illness in question. Hence we must know the nature of these diseases, how far they are superior to the bodily powers; at the same time, if there be anything divine in the diseases, we must make ourselves acquainted with these also. In this way one will justly gain a reputation and will be a good physician; one will indeed be better able to save those capable of cure if he has made up his mind long beforehand in each case, and no blame will attach to him if he has already foreseen and announced who is to die and who is to be preserved.

II. In acute diseases, the following observations are to be made. First, as regards the patient's face, whether it resembles that of a healthy person, and especially whether it is like its ordinary self; for this is best, whereas that most unlike the ordinary is most dangerous, as, for example—nose sharp; eyes hollow; temples sunken; ears cold and contracted and their lobes everted; the skin about the face hard, tense, and wizened; the colour of the whole face yellow or dark. And if the face be like this at the beginning and it is as yet impossible to judge what is wrong from the other signs, one must carefully inquire whether the patient has been sleepless, or his bowels have been specially loose, and whether he is suffering from hunger. If he confesses to any of these symptoms, the danger is to be reckoned so far less; the crisis comes within twenty-four hours if it is from these causes that the face has the appearance mentioned. If, on the other hand, he denies all these conditions, and recovery does not take place in the time stated, we must realise that this is an extremely grave sign. And if the disease has lasted longer than three days when the face shows these characteristics, inquiry must further be made concerning the points I mentioned before; and also the other symptoms are to be examined, both as regards the body as a whole and also in particular the eyes. If these shun the light, if they water involuntarily, or squint, or if one becomes smaller than the

other, or if the whites of the eyes grow red or have black veins in them; if matter forms about the eyeballs, and these become restless and very prominent or sunken, if the colour of the whole face alters; all these are to be looked on as of serious, nay, fatal import. One must also examine the partial appearance of the eyes in sleep; if any white still appears when the lids come together, and this does not result from diarrhœa or the taking of some drug, and the patient is not in the habit of so sleeping, the symptom is a bad one—in fact, extremely grave. And if along with one of the other symptoms the eyelid or lip or nose be deformed in shape or livid in colour, we may know that death is near. It is a fatal symptom also when the lips hang loosely and become cold and very white.

III. The patient ought to be found by the doctor resting either on his right or his left side, having his arms, neck, and legs somewhat bent, and his whole body lying relaxed. Such is the way in which most people in health lie, and the best positions to be in are such as nearest resemble those of healthy people. But to lie on the back, with the arms and legs extended, is less favourable. And if the patient should fall forward and slip down to the foot of the bed, this is still worse. If also he be found with his feet bare without their being particularly hot, and his hands and legs tossed about in a disorderly manner and bare, this is bad; it means that his mind is wandering. A very serious symptom also is to sleep with the mouth constantly open, and to lie on the back with the legs acutely flexed and twisted together. To lie on the stomach, unless one is accustomed to do so in health, is bad; it indicates either mental disturbance or pain in some part of the abdomen. For the patient to try to sit up when his disease is at its height is a bad sign in all acute diseases, and especially in pneumonia. Teeth-grinding in fever, unless in those people who have been used to do it since childhood, is a sign of insanity and very serious; if a person in delirium does this, it is extremely dangerous.

IV. As concerns movements of the arms, I am acquainted with the following. If in acute fevers, pneumonias, phrenitis, or headache the hands be moved in front of the face, searching through empty air, picking nap from the bedclothes, plucking at particles and snatching chaff from the walls—all such signs are bad, even dangerous.

V. Rapid respiration denotes pain or inflammation in the parts above the diaphragm. Deep and slow breathing points to mental disturbance. . . .

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VII. The abdomen [1] is best to be free from pain, soft, and equal on both right and left sides; if inflamed and painful, or rigid, or with the right side showing differences from the left—all these appearances are to be carefully watched. If there is also pulsation in the abdomen, this indicates a disturbance or mental distress; the eyes of such persons ought to be examined, for, if the eyeballs move restlessly, there is a possibility that the patient may become insane.

A swelling in the abdomen which is hard and painful is worst if it extends over the whole abdomen; if it should be on the one side, then it is less dangerous when on the left side. Such swellings at the commencement point to a danger of speedy death; but if the fever continues beyond twenty days, and the swelling does not subside, it passes into suppuration. During the first stage in such cases there occurs bleeding at the nose, which is very beneficial. But we must particularly inquire whether the patient has headache or dimness of vision; for if any such symptom occur, the disease will be determined in that direction. The bleeding at the nose is rather to be expected in those below thirty-five years of age. . . .

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X. With regard to sleep—as is our custom under ordinary conditions, the patient ought to be awake by day and to sleep at night. If this order be changed it is not a very good sign; but there will be least harm if he sleep from early morning for a third part of the day; sleep after this is less satisfactory. Worst is not to sleep either day or night; here either the insomnia is caused by pain and distress, or else mental disturbance may be expected to follow this sign. . . .

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XII. Urine is best when the deposit is white, smooth, and consistent throughout the disease, till the crisis occurs; this shows that there is no danger and that the trouble will be of short duration. But if there is intermittence, the urine being at one time clear and at another time showing the white, smooth, consistent deposit, then the disease becomes more

[1] In Greek "*hypochondrium*," *i.e.* below the bony thorax.

protracted and less free from risk. If the urine be reddish, and the deposit reddish and smooth, this will be a longer trouble than the last, although perfectly safe. Sediments like coarse meal in the urine are bad; still worse are flaky [leaf-like, "petaloid"] sediments. A deposit which is both thin and white is very bad; still worse than this is one resembling bran. Clouds suspended in the urine are good when white, but bad when dark-coloured. So long as the urine is thin and yellowish-red ["pyrrhous"], this shows that the disease is unconcocted; and if the disease should also last long while the urine remains like this, there is a danger that the patient may not be able to hold out until the disease is concocted. The more fatal types of urine are the fetid, watery, dark-coloured, and thick; in women and men it is the dark kinds which are worst, whereas in children it is the watery kinds. In those who pass thin, crude [*i.e.* unconcocted] urine for a prolonged period, if the other signs also point to recovery, an abscession (*apostasis*) may be expected to occur in the parts below the diaphragm. Fatty substances like spiders' webs, floating on the surface, are to be dreaded, as they are signs of wasting. We must also observe, in the urines which have clouds, whether these tend upwards or downwards and of what colour they are; and those at the bottom, if they have the colours which I stated to be good, are to be welcomed, while clouds on the top, having the colours I stated to be bad, must be considered unfavourable. Do not, however, be deceived if urines of this kind are produced owing to the bladder itself being diseased; here we have a sign of the state not of the whole body, but of the bladder by itself. . . .

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XIV. The sputum, in all pains about the lungs and ribs, should be quickly and easily brought up, the yellow appearing thoroughly mixed with the sputum. If it is brought up long after the pain has first shown itself, and is then yellow or reddish-yellow, or causes much coughing, or is not thoroughly mixed, this is less favourable. For sputum when yellow and unmixed is dangerous, while when white, sticky, and round it has no beneficial action. It is bad also when very green and frothy. If it is so uncombined as to appear black, this is still worse than the others mentioned. Another bad sign is where there is no expectoration and the lungs discharge nothing, but are full and gurgle in the throat. It is also bad when coryza and sneezing either follow or precede the various

lung-diseases, whereas in all other dangerous maladies sneezing is beneficial. If in pneumonia yellow sputum mixed with a little blood is brought up at the beginning of the illness, this is of very good augury; if this happens on the seventh day or later, it is less favourable. All kinds of expectoration are bad which do not remove the pain; worst are the black, as has been explained; better are all that remove the pain.

XV. Such of the pains in these parts as are not got rid of either by evacuation of sputum, by clearing the bowels, by venesection, by drugs, or by regimen must be expected to go on to suppuration. . . .

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XVII. All empyemas [1] are to be known by the following signs. Firstly, the fever does not abate, but is slight during the day and more at night; then comes a great deal of sweating. The patients have a desire to cough, but spit up nothing worth mentioning. Further, the eyes become sunken; the cheeks show red blotches; the finger-nails become curved; the fingers grow hot, especially at their tips; in the feet occur swellings, and over the body small blisters (*phlyctænæ*); the patients have no wish for food. . . .

. . . . . .

XXI. Marked and prolonged headaches with fever are very serious if accompanied by any of the deadly symptoms; but if, without these symptoms, the pain is prolonged for more than twenty days and the fever continues, one must expect bleeding at the nose, or some abscession (*apostasis*) into the lower parts; while, however, the pain is recent we may look for nose-bleeding or suppuration, especially if the pain is in the neighbourhood of the temples or the forehead; the bleeding is to be expected rather in those younger than thirty-five, and suppuration in older persons.

XXII. Acute pain in the ear accompanied by continuous high fever is to be dreaded; there is a risk that the patient may become delirious and die. Since then this type of disease is treacherous, one must also keep a sharp watch on the other signs from the first day. Younger patients succumb to this disease on the seventh day and even sooner, older people much more tardily; for fevers and delirium have less tendency to attack these latter, and hence their ears suppurate sooner. At these ages, however, relapses in the disease usually

[1] Apparently tubercular cavities in the lungs are included under this name.

prove fatal, while younger patients die before the ear begins to discharge. When white pus runs from the ear one may expect a young patient to recover, provided some other favourable symptom be superadded.

XXIII. An ulcerating throat, with fever, is serious; and, if any of the symptoms already classed as bad should supervene, announcement is to be made that the patient is in danger. Those quinsies (*cynanchæ*) are most dangerous and prove most rapidly fatal which do not show either in the throat or neck, but which cause excessive pain and difficulty in breathing (*orthopnœa*); these bring about suffocation on the first day, or the second, third, or fourth. There are some, again, which, while resembling these and causing pain, show a swelling and produce a redness (*erythema*) in the throat; these are extremely dangerous, although more protracted than the former type. Cases where the throat and neck share in the redness are also more protracted, and here recoveries occur, more especially if the neck and chest show redness and the *erysipelas* is not determined inwardly. And if the erysipelas does not disappear either on the critical days or with the formation of a growth [*phyma*, ? abscess] on the exterior, and if pus is not brought up easily and painlessly, this points to a fatal termination or to recurrence of the redness (*erythema*). The least dangerous is for the redness to be determined outwardly as much as possible; if it is determined to the lungs it causes delirium, and most of these cases pass into empyema.

It is very dangerous either to cut off or to lance the uvula while it is red and enlarged; inflammation supervenes in these cases, also hæmorrhage; one should try at this stage to reduce these swellings by other means. When, however, abscess-formation has fully taken place, constituting the so-called "grape" and the tip of the uvula is enlarged and livid, while the upper part is thinner, then is the time to operate without danger. It is better also to have the bowels slightly moved before performing this operation, if time permits and the patient is not suffocating. . . .

. . . . . .

XXV. He that is to forecast accurately which patients will recover and which will die, in which the disease will continue more days and in which less, must make himself thoroughly acquainted with all the symptoms and be able to judge them, estimating their powers in comparison with each other,

as has been described, especially with reference to the urine and sputa. One must also be prompt to realise the operation of endemic diseases, and must not overlook the constitution (*catastasis*) of the season. At the same time it is important to know, about the various signs and indications, that in every year and in every place the bad ones have a bad significance, and the good ones a good; for the symptoms described above prove to hold good in Libya, in Delos, and in Scythia. It may be easily understood, then, that there is nothing strange if in the same places one proves right in very many more instances, provided one studies the facts carefully and learns to judge and reason correctly about them.

There is no need to complain if the name of any disease happens to be omitted here; for you can tell all diseases which have their crises at the times here mentioned by these same signs.

HIPPOCRATES

SURGICAL EXTRACTS

Introduction

[It would be unpardonable to present a series of extracts from Hippocrates claiming to be illustrative without including at least one or two, however brief, on surgery. This art, within a somewhat restricted field, had, in Hippocratic times, reached a very high level. The anatomy of the bones and joints, and of course of the superficial parts, was well known. Apart from other occasions, a particularly valuable field of study and practice was afforded by the gymnasia and athletic schools, where frequent accidents took place. Dr. E. T. Withington has even suggested that, in the palæstra, dislocation of the shoulder-joint was often deliberately produced, if we may judge from the famous group of "The Wrestlers," and its great frequency; the reduction of this dislocation is particularly well described by Hippocrates. I have here given sample extracts from two treatises, one on dislocation of the hip-joint, and the other on congenital club-foot.

The treatise on dislocation of the hip-joint is one of the most famous of the surgical works of Hippocrates. It is remarkable that he considers inward dislocation of the head of the femur more common than outward, since all modern surgeons agree that the very opposite is—now at least—the case. No cogent explanation has been given of this discrepancy, although Jones suggests, "Possibly some grip in ancient wrestling made the internal form then more frequent."

The chapter on club-foot deals with that form known technically as Talipes varus (in which the outer border of the foot, rather than the sole, touches the ground), and has been called by Francis Adams "the most wonderful chapter in ancient surgery." It reads very much as a short modern treatise on the same subject might. The author seems to attribute the condition to some form of habit-spasm or contraction, rather than primarily to any structural abnormality in the bones.

In parenthesis it may be stated that this condition in children seems to be atavistic, since it is normal in the adult orang. See Hastings Gilford, *Brit. Med. Journ.*, June 8th, 1912.

The form of manipulative treatment or " bloodless surgery " which Hippocrates here recommends is, to all intents and purposes, the same as that employed at the present day.]

Greek text: Jones & Withington, Vol. 3.

Dislocation of Hip-joint

[From treatise "On Joints."]

(51) Should the head of the thigh-bone become displaced from the hip, this dislocation takes place in four ways: far most often inwards; and, of the other ways, most often outwards; it may also be displaced forwards and backwards, although seldom.

In cases where it is dislocated inwards, the leg appears longer when put alongside the other; this is natural, and for two reasons, viz. the head of the femur bears upon the bone which springs from the hip and passes up to the pubes, while the neck of the femur is supported by the cotyloid cavity. Externally, again, the buttock looks flattened, owing to this inward inclination of the head of the femur. Further, the end of the femur at the knee is forcibly turned outwards, and the leg and the foot correspondingly. Hence, owing to this outward inclination of the foot, the physicians, through inexperience, bring the sound foot to it, instead of bringing it to the sound foot; therefore the damaged foot looks much longer than the sound one; and thus also many other misapprehensions arise. Moreover, the patients are quite unable to bend at the groin as in the normal condition. Besides this, on palpation, the head of the femur is clearly recognised forming an undue prominence in the perinæum.

These then are the signs in cases of internal dislocation of the femur.

(54) In all cases where the head of the thigh-bone becomes displaced outwards, the leg looks shorter than the other when extended alongside it; this is natural, since the head of the femur does not bear upon bone in the same way as in the case of the dislocation inwards, but lies upon bone which naturally slopes away, and it is supported by soft and

yielding flesh; this is why it appears shorter. Internally the thigh at what is called the fork appears flatter and less fleshy; while externally the buttock is more rounded owing to the outward displacement of the head of the femur; furthermore, the buttock seems higher up, owing to the flesh here yielding before the head of the femur. At the knee the end of the femur seems to incline inwards, as also the leg and the foot; moreover, the patient cannot bend it like the sound leg.

These then are the signs of external dislocation of the thigh.

(70) Dislocation of the thigh at the hip is to be reduced as follows, if the dislocation is inward. This method of reduction is a good and proper one, and in accordance with nature; moreover, it has something masterly about it, pleasing to those who like to make some display in such matters. The patient must be hung up by his feet from a cross-beam, with a band which is strong, but soft and broad. The feet are to be kept about four fingers' breadth, or even less, apart from one another. He must in addition be bound above the knee-caps with a broad soft strap, reaching up to the cross-beam, and the injured leg is to be extended some two fingers' breadth more than the other. The head is to be kept two cubits, or a little more or less, from the ground; the patient is to be bound with something soft, his arms extended along his sides. Let all these preparations be made while he is lying on his back, so that he has to hang as little time as possible.

When he is suspended, let a well-trained man of considerable strength insert his forearm between the patient's thighs, and bring it into position between the perinæum and the dislocated head of the femur. Next, grasping the inserted hand with the other, and standing upright beside the body of the suspended patient, let him suddenly hang himself on to him and keep suspended in the air in as good equilibrium as possible. This method provides all the conditions requisite for natural reduction; for the body itself produces extension by its own weight, and the suspended assistant also causes extension, thus forcing the head of the femur to project over the cotyloid cavity, while at the same time, by levering it with the bone of his forearm, he makes it slip back into its original position.

The bandaging must be applied in the most perfect way,

and the suspended assistant must be an intelligent and extremely powerful man.

[Here follow a series of directions for the reduction of more obstinate cases of hip-joint dislocation.]

Club-foot

[*Ibid.*]

There are also some of the congenital dislocations which, if slight, can be brought back to the normal, especially those involving the joints of the foot. The majority of cases of congenital club-foot are curable, unless the displacement is very great, or the child is already advanced in growth. It is best to remedy these defects as quickly as possible, before the deficiency in the bones of the foot becomes pronounced, and there is a corresponding deficiency in the flesh of the leg. Now there is not one, but several kinds of club-foot; in most cases there is not complete disarticulation, but a deformed posture produced by habitual contraction of the foot. In treatment, attention must be directed to the following. Hold the leg-bone at the ankle straight, and press upon it from without inwards, at the same time making counter-pressure outwards upon the bone of the heel, in such a direction as to bring together the bones which are projecting at the middle and side of the foot; further, bend or rather force round the whole of the toes, including the great toe. Dress with cerate well mixed with resin, and with pads and soft lint sufficient in amount but not pressing too much; make the turns of the bandage to correspond with the previous manual rectification of the foot, so that there rather appears to be a slight tendency to flat-foot [*i.e.*, an exaggeration in the other direction from club-foot].

A sole should be made, either of not too hard hide, or of lead, and this should be bound on, not immediately in contact with the skin, but just when you are going to put on the last dressings; as soon as the latter are applied, one must stitch the end of a bandage to the dressings on the foot, and in line with the little toe, then stretch this upwards as far as may seem suitable, and pass it round the calf-muscle above, in order that, so stretched, it may remain in place. In a word, it is like the operation of wax-modelling; one has to

restore to the normal such parts as are abnormally displaced and contracted, rectifying them in this way by hand and then fixing them with bandages, not bringing them together violently, but by gentle means. The bandages are sewn on in order to give the needful support; for one kind of lameness needs one kind of support, and another kind another.

A leaden boot may be made and fixed on outside the bandages, shaped as the Chian boots used to be [*i.e.* well up the ankle]. But this is quite unnecessary if the manual rectification, the fixing on of the bandages, and the supporting have been properly carried out.

Such, then, is the treatment, and there is no need either for cutting or burning, or any other complicated procedure; these cases respond to treatment more quickly than one would think. Time is also needed, however, to help in the victory, until the parts have grown into their correct shape. And when the question of footwear comes up, the most suitable are the boots called "mud-treaders" (*pēlopatides*), for these yield to the foot less than any other kind; indeed the foot rather yields to them. The Cretan form of footwear is also useful.

THUCYDIDES

THE PESTILENCE AT ATHENS (430 B.C.)

Introduction

[THE "plague" here described by the foremost historian of Greece broke out in the second year of the Peloponnesian War (between Athens and Sparta). All great wars have apparently been accompanied or followed by some such extensive "plague" or epidemic, whose exact nature varies from time to time, in one case being typhus or typhoid; in another, plague proper (bubonic or pulmonary); in others, cholera, dysentery, or small-pox; in the Great War it was the so-called "influenza," which is said to have killed more people than any other epidemic recorded in history.[1] In this recent case, as not uncommonly happens, a relatively benign malady became transformed into a decimating pestilence. It is to be noted that Thucydides, in his description, says that all other diseases ended in, or became transformed into, the plague in question.

If there is any of our modern epidemics to which the Athenian "plague" may be held to have corresponded, this is probably typhus;[2] but we need not assume that diseases so many centuries ago were exactly the same as those of the present day. In favour of the Athenian plague having been typhus or something closely allied, one may note our author's reference to such symptoms as the following:— Sudden onset, fever, headache, redness of eyes, vomiting, bronchial catarrh, thirst, rash, sleeplessness (coma-vigil); to such complications as pneumonia, gangrene of extremities and of genital organs; and to the fact that one attack is said to have conferred at least relative immunity.]

[1] See "La Guerre et la Grippe," par L. Hersch, *Rev. de Genève*, December 1924.

[2] See "Plague and Pestilence in Literature and Art," by Raymond Crawfurd; also a letter by Dr. D. Mackenzie Macrae in *Lancet*, October 17, 1914.

The Pestilence at Athens (430 B.C.)

(Thuc., Book II, 47–53.)

Greek text: Oxford Pocket Edition.

Such, then, were the funeral rites which took place that winter, and, on their completion, the first year of this war came to a close. Then, at the very beginning of summer, two-thirds of the Peloponnesians with their allies invaded Attica, their leader being Archidamus, son of Zeuxidamus, and king of the Lacedæmonians, and they settled down and began to ravage the land. Now they had not yet been many days in Attica when the plague (*nosos*) began to appear amongst the Athenians. It is said that this had already broken out at many points, such as about Lemnos and in other places; yet no such great pestilence, nor such destruction of human lives was anywhere remembered. For not only were physicians unable to do anything at first, owing to the ignorance with which they carried out treatment, but they themselves died in greatest numbers for the very reason that they came most in contact with the cases. Nor was any other art of man effective. Supplications at the temples and recourse to oracles and the like were all unavailing; finally, they abandoned these and surrendered to the evil.

It began, as is related, in Ethiopia beyond Egypt, and then descended also into Egypt and Libya, as well as into most of the territory of the Great King. It next fell without warning upon the city of the Athenians, first affecting people in the Piræus, so that they even said that the Peloponnesians had put poison into the water-tanks (there not yet being any wells there); later on it reached the upper city, and there were then many more deaths.

Now regarding this plague, everyone, whether physician or layman, may be allowed to state his view as to its probable origin and the causes which could have produced such a disturbance. Personally, I shall give a description of what it was like, so that in the light of this, if there should ever be another attack, people may have some foreknowledge, and not be in ignorance; for I myself have had the disease, and have seen others suffer from it.

It was agreed that of all years this one happened to be especially healthy as regards other diseases; but in the cases

where people were already ill in any way, their illnesses all ended in this particular one. The majority, without any cause (*prophasis*) and in full health, were suddenly seized, first with violent heats in the head, and redness and inflammation of the eyes; while inside the head the throat and tongue became rapidly injected with blood, and the breath emitted was unnatural and fetid. Next after these symptoms came sneezing and hoarseness, and after a short while the pain descended into the chest, accompanied by violent coughing. Then, settling in the stomach (*cardia*), it upset this, and all the purgings of bile described by doctors followed, these being accompanied by great distress. Also in most cases an ineffectual retching supervened, which gave rise to violent spasms, in some after the previous symptoms had abated, and in others at a much later stage. Further, outwardly the body was not very hot to the touch, nor was it yellow in colour, but reddish and livid, with an eruption of small blisters (*phlyctænæ*) and ulcers. Inwardly, however, there was such great heat that the sufferers could not bear even the pressure of quite thin clothes or muslin, or anything but complete absence of clothing, and they would have gladly thrown themselves into cold water. Indeed many who were not watched did actually leap into tanks, under the stress of their unquenchable thirst; but it mattered nothing whether they drank much or little. And there was constant distress from restlessness and insomnia. As long as the disease was at its height the body did not languish, but resisted the suffering to a surprising degree. Hence the majority of cases either died on the ninth or seventh days, still possessing, by reason of this internal heat, some measure of strength; or, if they survived, the disease descended into the alimentary canal, and then violent ulceration took place there, accompanied by an unmixed diarrhœa, and from the weakness produced by this the majority then died later. Thus the trouble which first had its seat in the head went through the whole body, beginning from above, and if anyone survived the main dangers of the disease, it at least left its mark upon the extremities; thus it would attack the private parts and the hands and feet; and many survived with the loss of these parts, and in some cases even their eyes. Other patients as soon as they got up were seized with complete loss of memory (*lêthe*), and failed to recognise either themselves or their relations.

Now the character of the disease began to be such as defies

description; not only was its attack more grievous than human nature could bear, but in the following way it showed itself to be something of another kind than ordinary everyday evils. For the various birds and four-footed beasts which devour human beings when there are many lying about unburied, either did not go near them, or, if they tasted them, perished. A proof of this is the fact that a scarcity of such birds made itself evident, and they were seen neither near any of these unburied corpses nor anywhere else. And the dogs provided a yet better demonstration of this effect, since they live with human beings.

Leaving aside, then, other remarkable features of the disease, since to a certain extent different symptoms appeared in different cases, its character was on the whole as described. None of the usual illnesses caused trouble along with it, but any that did occur ended in this malady. Death took place in some cases from carelessness, and in others despite careful treatment. Neither one remedy nor another, practically speaking, was found, on administration, to be useful; what helped one person harmed another. And no constitution seemed able to withstand the disease, either as regards strength or weakness; it seized and crushed them, whatever the regimen to which they were subjected.

The most terrible feature of the whole trouble was the depression (*athymia*) which seized all who knew themselves attacked; giving way forthwith to despair they involved themselves still further, and made no resistance : so too the fact that they became infected from attendance on each other and died like sheep—this was the principal cause of mortality. For either through fear they were unwilling to come near each other, and so died in solitude, and many households were emptied for want of someone to treat them; or else they did associate together and so perished, especially those who were making some show of courage; for out of shame they did not spare themselves, but entered into their friends' houses, when even relatives were growing weary of the most ordinary lamentations for their departed, and were capitulating before the magnitude of the evil. Yet still more did those who had recovered pity the dying and the stricken because of their own previous experiences and their present safety, for the disease never attacks the same individual a second time fatally. And they were congratulated by the others, and they themselves, through the excess of their

present joy, had some slight hope for the future too, that they would never perish from any other disease.

What added to their sufferings, apart from the actual disease, was the crowding in from country districts to town, and the incomers themselves were no less affected. For as there were no houses, and they lived in stifling huts, and the season was summer, destruction fell upon them without discrimination; they lay dying, one upon another, and wallowed on the roads around all the springs, half dead in their craving for water. And the temples in which they were quartered were full of the dying; for under the extremity of the plague men did not know what was to happen to them, and became negligent of things sacred and profane alike. All the burial rites which they had before used were thrown into confusion, and they buried their dead as each could. Many resorted to shameless forms of burial from lack of appliances caused by the large numbers of their friends who had already died. Thus some forestalled the makers of the funeral pyres, laying their own dead on the pyres and setting them alight, while others threw the bodies they were carrying on to the pyre where another corpse was burning, and so went their way.

In every other respect, too, the disease gave the first occasion for a great outbreak of lawlessness in the State. For people more readily dared to indulge in sensual pleasures which they had previously concealed, seeing the sudden change in fortunes of rich men who died suddenly, and of those who had nothing before, but at once possessed the property of the former. Consequently, men saw fit to gratify their fleeting lusts and to make pleasure their chief aim, believing body and property to be alike shortlived. No man was anxious to trouble himself further about what was esteemed honourable, for he thought it uncertain whether or not he would die before reaching it; but what provided immediate gratification and what was in any way conducive thereto—such was considered good and expedient. No fear of gods or law of men was a hindrance; they put the same value on both piety and impiety, from seeing all men perishing alike, while no one expected he would live till the day of reckoning and pay the penalty of his misdeeds; far greater did they believe to be the penalty already recorded against them, and even now hanging over them, and before this fell they thought it reasonable to have some enjoyment of life.

Under such an experience (*pathos*) the Athenians suffered

sorely, with men dying inside the city and the land being ravaged outside. In the trouble they naturally recalled the following saying, which, according to the older men, had been long ago delivered:—"There shall come a Dorian war, and plague (*loimos*) with it." Now a dispute broke out among men, that "plague" (*loimos*) was not the word used by the ancients in the saying, but "famine" (*limos*), although in the present instance the view naturally prevailed that "plague" was the word; for men made their memory conform to their sufferings. Yet I believe that if ever another Dorian war comes upon them after this one, and a famine happens to arise, so in all probability will they recite it. Recollection, too, of the oracle given to the Lacedæmonians came to those who knew it, how when they asked the god if they should go to war, he replied, "Make war with might and main, and victory will be yours," and he said he would help them. Now as regards the oracle, they found upon comparison that current events agreed with it; it had been as soon as the Peloponnesians had made their inroad that the plague had begun, and it did not penetrate to the Peloponnese to any appreciable extent, but spread over Athens especially, and, next to that, the most densely populated of the other places. Such then is the history of the disease.

Book III, Chap. 87.

In the following winter [428–427 B.C.] the disease (*nosos*) for the second time fell upon the Athenians; although it had at no time entirely ceased, there was nevertheless a kind of respite. It lasted on the later occasion not less than a year, and on the former quite two years, so that nothing afflicted the Athenians more than it, or crippled their power more. For no less than four thousand four hundred hoplites died in the ranks, and three hundred cavalry, while of the populace the number could not be counted.

PLATO

PSYCHOLOGICAL EXTRACTS

[Regarding the place of Plato in the history of Greek Medicine I have already spoken in the General Introduction (p. 13). The argument of the first of the two following extracts is elaborated by Galen in a passage also included in the present collection (p. 231): this may be termed the "bio-psychological" argument; while that of the second extract, although ostensibly in opposition to it, is really complementary, and constitutes the "psycho-biological" argument or approach.]

Text of "Phaedo"; Teubner's, with emendations by Fearenside and Kerin. University Tutorial Series, London.

(1) The Argument for Psychical Determinism ("Bio-psychosis")

("Phædo," Chap. XXXVI.)

[The following is an objection of Simmias to the arguments of Socrates in favour of the soul's immortality. Prof. J. Burnet says this is "clearly an application of the theory of Alcmæon" [cf. p. 6], who held health to depend on the *isonomia* or accurate adjustment of various sensible qualities such as heat and cold, bitterness and sweetness, etc., and disease on the preponderance or *monarchia* of any one of them. In other words, to Alcmæon health was a *balance* of certain tendencies, which manifested themselves as heat, cold, etc. We shall see the present theory, that psychology is merely physiology, or, more exactly, physics or chemistry, further developed by Galen in his treatise "That the Mental Faculties follow the Bodily Constitution" (see p. 231).]

Simmias speaks: "In fact, Socrates, I think you yourself realise that we mainly look on the soul in some such way as the following. The body being, so to say, strung and held together by the warm and cold, the dry and moist, and the

like, the soul is a *mixture* (*crasis*) and *harmony* of these principles when they are well and proportionately blended with each other. If, then, the soul is a kind of harmony, it is clear that, if our body becomes subjected through disease or other troubles to *excessive relaxation* or *tension*, then the soul, however divine it may be, is at once destroyed, just like other harmonies, whether of sounds or of the various works of craftsmen; on the other hand, the bodily remnants persist for a long time, until either they are burned or decay. Consider then what we shall reply to this argument, if anyone were to hold that the soul, being a *crasis* or mixture of the bodily elements, is first to perish at what is called death."

(2) The Argument for Free-will ("Psycho-biosis")

("Phædo," Chap. XLIII.)

[Socrates' response to the foregoing argument of Simmias.]

"What then," says Socrates, "of all the elements in a man, is there any except *the soul* that, you would say, *rules*, especially when the man is intelligent?" "No," says Simmias, "I would not."

"And does the soul rule by *obeying* the bodily passions, or by *opposing* them? I mean, for example, when fever and thirst are present, does it pull in the other direction, so that ones does not drink; and, when hunger is present, so that one does not eat? And are there not countless other instances to be seen of the soul opposing the bodily forces?" "Certainly there are."

"On the other hand, did we previously agree that the soul, *if it is a harmony*, would never sound in opposition to the tensions, relaxations, vibrations, and other modifications of those parts of the body to which it belongs, but would follow them and never lead them?" "Most certainly we agreed this."

"Well then, do we not now see it doing the exact opposite —leading these very elements from which it is said to spring, opposing nearly all of them throughout life, and proving its mastery in every way; chastening some with more difficulty and even with pain; others by gymnastics and medicine, and others by milder measures; sometimes threatening, and at other times admonishing the various desires, angers, and fears; and speaking all the time as though to something

of a different nature?—just as Homer does in the ' Odyssey,' where he says that Odysseus,

" ' Striking his breast, spake sternly to his heart—" Bear up,
my heart. For thou hast endured other far worse ills." '

Do you think that the poet composed this under the idea that the soul is a harmony, of a nature to be led by the bodily passions, rather than that it is able to lead and master them, being a thing much too divine for a harmony? " " By Zeus, Socrates, I do not think that he did."

" Then, dear friend, we do in no wise well to say that the soul is a ' kind of harmony,' for, in so saying, we neither agree with the divine poet Homer, nor yet are self-consistent." And Simmias acknowledged that this was so.

ARISTOTLE

[Aristotle (384–322 B.C.), the most comprehensive mind of classical antiquity, if not of all times, carried the direct objective method of Hippocrates into general biology. Of the following extracts the fourth, fifth, and sixth especially illustrate this method; the fifth gives Aristotle his title to be called the founder of embryology. In the second extract he differentiates tissues from organs, a fertile generalisation which Galen took over from him, but whose truth was never again properly appreciated till the end of the eighteenth century, when Bichat made it the foundation of his *Anatomie Générale*. Of human anatomy Aristotle had scant knowledge; for this we must wait till the time of his successors the Alexandrians and of Galen.]

Text. The extracts are all from the Oxford Translation of Aristotle.

(1) Defence of Biological Study

("The Parts of Animals," 644, *b*22 *sqq.*)

Having already treated of the celestial world, as far as our conjectures could reach, we proceed to treat of animals, without omitting, to the best of our ability, any member of the kingdom, however ignoble. For if some have no graces to charm the sense, yet even these, by disclosing to intellectual perception the artistic spirit that designed them, give immense pleasure to all who can trace links of causation, and are inclined to philosophy. Indeed, it would be strange if mimic representations of them were attractive, because they disclose the mimetic skill of the painter or sculptor, and the original realities themselves were not more interesting, to all at any rate who have eyes to discern the reasons that determined their formation. We therefore must not recoil with childish aversion from the examination of the humbler animals. Every realm of nature is marvellous: and as

Heraclitus, when the strangers who came to visit him found him warming himself at the furnace in the kitchen and hesitated to go in, is reported to have bidden them not to be afraid to enter, as even in that kitchen divinities were present, so we should venture on the study of every kind of animal without distaste; for each and all will reveal to us something natural and something beautiful. Absence of haphazard and conduciveness of everything to an end are to be found in Nature's works in the highest degree, and the resultant end of her generations and combinations is a form of the beautiful.

If any person thinks the examination of the rest of the animal kingdom an unworthy task, he must hold in like disesteem the study of man. For no one can look at the primordia of the human frame—blood, flesh, bones, vessels, and the like—without much repugnance. Moreover, when any one of the parts or structures, be it which it may, is under discussion, it must not be supposed that it is its material composition to which attention is being directed or which is the object of the discussion, but the relation of such part to the total form. Similarly, the true object of architecture is not bricks, mortar or timber, but the house.

(2) The Three Degrees of Composition

(*Ibid.*, 646.)

Now there are three degrees of composition; and of these the first in order, as all will allow, is composition out of what some call the elements, such as earth, air, water, fire. Perhaps, however, it would be more accurate to say composition out of the elementary forces; nor indeed out of all of these, but out of a limited number of them, as defined in previous treatises. For fluid and solid, hot and cold, form the material of all composite bodies; and all other differences are secondary to these, such differences, that is, as heaviness or lightness, density or rarity, roughness or smoothness, and any other such properties of matter as there may be. The second degree of composition is that by which the *homogeneous* parts of animals, such as bone, flesh, and the like, are constituted out of the primary substances. The third and last stage is the composition which forms the *heterogeneous* parts, such as face, hand, and the rest.

(3) Homologous and Analogous Organs

(*Ibid.*, 645.)

Many groups, as already noticed, present common attributes, that is to say, in some cases absolutely identical affections, and absolutely identical organs,—feet, feathers, scales, and the like; while in other groups the affections or organs are only so far identical as that they are analogous. For instance, some groups have lungs, others have no lung, but an organ analogous to a lung in its place; some have blood, others have no blood, but a fluid analogous to blood, and with the same office.

(4) Habits of Fishing-Frog and Torpedo

("History of Animals," 620, *b*.)

The fishing-frog has a set of filaments that project in front of its eyes; they are long and thin like hairs, and are round at the tips; they lie on either side, and are used as baits. Accordingly, when the animal stirs up a place full of sand and mud and conceals itself therein, it raises the filaments, and, when the little fish strike against them, it draws them in underneath into its mouth. The torpedo narcotises the creatures that it wants to catch, overpowering them by the power of shock that is resident in its body, and feeds upon them; it also hides in the sand and mud, and catches all the creatures that swim in its way and come under its narcotising influence. This phenomenon has been actually observed in operation. The sting-ray also conceals itself, but not exactly in the same way. That the creatures get their living by this means is obvious from the fact that, whereas they are peculiarly inactive, they are often caught with mullets in their interior, the swiftest of fishes. Furthermore, the fishing-frog is unusually thin when he is caught after losing the tips of his filaments, and the torpedo is known to cause a numbness even in human beings.

(5) Embryology of Chick

(*Ibid.*, 561, *a*4–*b*29.)

Generation from the egg proceeds in an identical manner with all birds, but the full periods from conception to birth

differ, as has been said. With the common hen after three days and three nights there is the first indication of the embryo; with larger birds the interval being longer, with smaller birds shorter. Meanwhile the yolk comes into being, rising towards the sharp end, where the primal element of the egg is situated, and where the egg gets hatched; and the heart appears, like a speck of blood, in the white of the egg. This point beats and moves as though endowed with life, and from it two vein-ducts with blood in them trend in a convoluted course as the egg-substance goes on growing, towards each of the two circumjacent integuments; and a membrane carrying bloody fibres now envelops the yolk, leading off from the vein-ducts. A little afterwards the body is differentiated, at first very small and white. The head is clearly distinguished, and in it the eyes, swollen out to a great extent. This condition of the eyes lasts on for a good while, as it is only by degrees that they diminish in size and collapse. At the outset the under portion of the body appears insignificant in comparison with the upper portion. Of the two ducts that lead from the heart, the one proceeds towards the circumjacent integument, and the other, like a navel-string, towards the yolk. The life-element of the chick is in the white of the egg, and the nutriment comes through the navel-string out of the yolk.

When the egg is now ten days old the chick and all its parts are distinctly visible. The head is still larger than the rest of its body, and the eyes larger than the head, but still devoid of vision. The eyes, if removed about this time, are found to be larger than beans, and black; if the cuticle be peeled off them there is a white and cold liquid inside, quite glittering in the sunlight, but there is no hard substance whatsoever. Such is the condition of the head and eyes. At this time also the larger internal organs are visible, as also the stomach and the arrangement of the viscera; and the veins that seem to proceed from the heart are now close to the navel. From the navel there stretch a pair of veins; one towards the membrane that envelops the yolk (and, by the way, the yolk is now liquid, or more so than is normal), and the other towards that membrane which envelops collectively the membrane wherein the chick lies, the membrane of the yolk, and the intervening liquid. For, as the chick grows, little by little one part of the yolk goes upward, and another part downward, and the white liquid is between them; and the

white of the egg is underneath the lower part of the yolk, as it was at the outset. On the tenth day the white is at the extreme outer surface, reduced in amount, glutinous, firm in substance, and sallow in colour.

The disposition of the several constituent parts is as follows. First and outermost comes the membrane of the egg, not that of the shell, but underneath it. Inside this membrane is a white liquid; then comes the chick, and a membrane round about it, separating it off so as to keep the chick free from the liquid; next after the chick comes the yolk, into which one of the two veins was described as leading, the other one leading into the enveloping white substance. A membrane with a liquid resembling serum envelops the entire structure. Then comes another membrane right round the embryo, as has been described, separating it off against the liquid. Underneath this comes the yolk, enveloped in another membrane (into which yolk proceeds the navel-string that leads from the heart and the big vein), so as to keep the embryo free of both liquids.

About the twentieth day, if you open the egg and touch the chick, it moves inside and chirps; and it is already coming to be covered with down, when, after the twentieth day is past, the chick begins to break the shell.

(6) The Stomach of Ruminants

("History of Animals," 507, *a*.)

Animals present diversities in the structure of their stomachs. In the first place, of the viviparous quadrupeds, such of the horned animals as are not equally furnished with teeth in both jaws are furnished with four such chambers. These animals, by the way, are those that are said to chew the cud. In these animals the œsophagus extends from the mouth downwards along the lung, from the midriff to the big stomach (or paunch); and this stomach is rough inside and semi-partitioned. And connected with it near to the entry of the œsophagus is what from its appearance is termed the "reticulum" (or honey-comb bag); for outside it is like the stomach, but inside it resembles a netted cap; and the reticulum is a great deal smaller than the stomach. Connected with this is the "echinus" (or many-plies), rough inside and laminated, and of about the same size as the

reticulum. Next after this comes what is called the "enystrum" (or abomasum), larger and longer than the echinus, furnished inside with numerous folds or ridges, large and smooth. After all this comes the gut.

(7) Man and His Hands

("The Parts of Animals," 183.)

Much in error then, are they who say that the construction of man is not only faulty, but inferior to that of all other animals; seeing that he is, as they point out, barefooted, naked, and without weapon of which to avail himself. For other animals have each but one mode of defence and this they can never change; so that they must perform all the offices of life and even, so to speak, sleep with sandals on, never laying aside whatever serves as a protection to their bodies, nor changing such single weapon as they may chance to possess. But to man numerous modes of defence are open, and these, moreover, he may change at will; as also he may adopt such weapon as he pleases, and at such times as suit him. For the hand is talon, hoof, and horn, at will. So too it is spear, and sword, and whatsoever other weapon or instrument you please; for all these can it be, from its power of grasping and holding them all.

RUFUS OF EPHESUS

ON THE INTERROGATION OF THE PATIENT

Introduction

[Rufus of Ephesus is one of the greatest of the immediate predecessors of Galen, who often quotes him. He is believed to have practised in the time of Trajan; that is, in the earlier part of the second century A.D. Like Galen, he learned his anatomy at Alexandria, and some parts of his important work on anatomical nomenclature are included in the present collection. Most of his work, however, has been lost. His method is essentially eclectic and synthetic; he incorporates the best features of the various Greek medical schools.

The treatise "On the Interrogation of the Patient" exhibits these synthetic tendencies well. It is an appeal for breadth of vision in medicine, and particularly for consideration of the time-factor in disease. He would have us take "the history of the case" into account and not content ourselves with merely observing present signs and symptoms, however minutely. With him, as with all experienced physicians in all ages, disease is a process rather than a state. This thesis is, of course, fundamental in the teaching of Hippocrates, as illustrated, for example, in the "Prognostic" (cf. p. 83). Yet, while Rufus agrees with Hippocrates that a consideration of present signs will often tell us the future, he asserts that often we must know the past as well, before the future can be accurately gauged. He is particularly severe upon one Callimachus, who apparently belonged either to the Empiric or the Methodic schools, neither of which interested themselves either in causation or case-histories (cf. General Introduction, pp. 15, 18).

The following is the general line of argument followed by Rufus in this treatise:—We must ask questions—both of the patient and those about him—in order to arrive at this necessary knowledge of past factors. And there are other

important factors besides the original " cause "; such are the patient's inherited disposition (*physis*) on the one hand, and what he has accustomed himself to on the other; again, certain localities have characteristic (endemic) diseases, often due to the qualities of the local water and so forth (compare Hippocrates' "Airs, Waters, and Places"). Incidentally Rufus gives us interesting clinical notes on hydrophobia, on guinea-worm disease, etc. He ends with some critical notes on Hippocrates, whose method he thinks needs to be supplemented by his own.]

Greek text, Ch. Daremberg's edition, Paris, 1879.

[What can be learned by questioning the patient. First, his manner of speaking gives us indications of his mental and physical condition.]

One must put questions to the patient, for thereby certain aspects of the disease can be better understood, and the treatment rendered more effective. And I place the interrogation of the patient himself first, since in this way you can learn how far his mind is healthy or otherwise; also his physical strength and weakness; and you can get some idea of the disease and the part affected. For, if his answers are given in a consecutive way, and from memory, and are relevant, and if he shows no hesitancy either in judgment or utterance; if he answers according to his natural bent; that is to say, if, being in other ways well-bred, he answers gently and politely; or if, on the other hand, being naturally bold or timid, he answers in a bold or timid way, one may then look on him as being at least sound mentally. But if you ask him one thing and he answers another; and if in the middle of speaking his memory fails him; if, again, his enunciation is tremulous and hesitating and he exhibits complete changes of manner; all these are signs of mental inadequacy. In this way one also appreciates deafness in a patient; if he does not hear, one must in addition inquire of those about him whether he was in any way deaf before, or whether it is the disease that has made him so. This is a very important diagnostic point.

As to the physical strength or weakness of patients, you will recognise these clearly if you have to do, on the one hand, with an individual possessing full vocal power, and who relates events in a straightforward way, while another makes frequent pauses and speaks in a feeble voice.

By such questioning one also gets some idea of the kind of disease and of certain conditions which are common in the chest and lungs. Thus misplaced boldness or depression are signs of *melancholia*, and it is chiefly by his speech that an individual shows boldness or grief. He shows these also in other ways, but if the physician has the experience we are speaking of as well, he will now easily diagnose the condition. Further, an individual sickening for lethargic fever (*lethargus*) is observed, when answering, to forget what he says and to be uncertain in his utterance. This happens when there is fever; in default of which, convulsions and epilepsies may be looked for. Generally speaking, if the whole thing is a matter of mental disturbance, this is more easily recognised by the method of questioning than by any other.

Again, the state of the chest is evidenced by shrillness or hoarseness of the voice; thus in phthisis and asthma the voice is shrill, while in empyema, in throat conditions, and in severe catarrh it is hoarser. Those whose tongues are paralysed cannot speak at all.

[When other people besides the patient have to be questioned. What questions must be asked. Importance of knowing on what day of the disease certain symptoms occur.]

Thus, as I have said, one must begin by questioning the patient himself regarding such points as are necessary to know; next also those about him should be questioned, if there are any obstacles from the side of the patient in getting information. Such obstacles are: severe mental disturbance, apoplexy, lethargus, catalepsy, aphasia, or other forms of mental weakness, or complete bodily debility, or where it is desirable to speak as little as possible, as in hæmorrhage from the lung. In the case of a child also someone else must be questioned; also in the case of a very old person; where a patient does not speak one's language, an interpreter must be employed.

First we have to ask at what time the illness began; this is most valuable both for treatment and for reckoning the critical days; it suffices for setting us on the look-out for the periodical occurrence of the latter. In fact, to know when the disease began is of great value for a complete diagnosis of the illness; the same symptoms, when they appear at irregular times, have varying significance.

. . . . . .

[Importance both of innate nature and of habit. "What is one man's meat is another man's poison." Likes and dislikes. Habituation to food. Error of Callimachus, who holds that diagnosis and treatment may be based entirely on symptoms, and that to study the history of a case is superfluous.]

The next thing to ask is whether what has now happened is one of the diseases to which the individual is accustomed, or is something which has never happened to him before. For, speaking generally, many people fall ill more than once with the same disease, have the same symptoms and are similarly treated. The physician might fear that these would be very difficult to prevent, and unsuitable for treatment; yet they find them not serious for this individual at least, nor unsuitable for treatment in the present case. Indeed in all cases *Habit* is of the greatest importance, both in aiding tolerance of serious conditions and in promoting cure. Accordingly, I believe that it is well to inquire also about each person's nature (*physis*) in various respects: we are not all naturally the same; we differ very greatly from one another in all sorts of ways. Thus, if you take the trouble to ask how matters are with regard to digestion, you will find some things easily digested by some people and badly by others. Again, drugs taken to cause catharsis, or which are passed by the urine, act differently on different people, certain purgatives even producing vomiting, and certain emetics causing purgation. In a word, none of these substances is so constant in its action that the physician can place it in a single category.

The patient must therefore also be asked how he is naturally affected by each article of food and drink; if he is obviously used to any drug, this also must not be overlooked. We shall, in fact, have most success by thus asking the patient as well about anything that happens in his case out of the ordinary. As a general rule one will ask whether he has a good or a bad appetite, whether he tends to be very thirsty or not, and also of his *habits* in each respect; for it is a great matter to be acquainted with a person's habits; no less, indeed, than with his natural disposition. The fact is that food to which one is accustomed is taken with less trouble than food which might otherwise seem best. It is important also to know in what way the patient has learned to take his food, in what quantity, and how prepared. In short, all customary things are best, for the sick as well as for the healthy.

By asking about the habits also one may judge more

accurately regarding a person's judgment, his conversation, whether he is careless, and of his activities in general. For what is habitual to a person when well gives no clear evidence of itself when he is ill, and it is not possible for the doctor to find out any of these particulars by himself; he must ask either the patient or some of those who are about him.

This is why I am surprised at Callimachus; he alone of all physicians of the past—or at least of those to whom one would pay any attention—maintains that it is unnecessary to make any inquiries either about other diseases or injuries, and particularly those of the head. He holds that the physical signs (*semeia*) in each case are enough to indicate both the disease and its cause, and that on these we can base the whole prognosis and a more efficient treatment. He considers it superfluous to ask about even the determining causes of a disease, such as the manner of life and the various occupations, or whether the patient happened to be tired or cold when he was attacked. He maintains that the physician has nothing to learn from any of these, if he will but carefully consider the signs occurring in each disease.

My own view, however, is that, while one may discover a great deal by one's self about disease, yet one does this best and most definitely by means of questions; for, if the result of these corresponds with the signs found, the condition is then more easily known. For example, supposing a patient tells us that he had been taking more than his usual amount of food and drink, and that he now feels as one might expect to do if surfeited; then one may safely diagnose his condition as surfeit, and, furthermore, we thus discover the whole treatment. Or, again, if a patient says that he has been doing a great deal of hard work, and that his feelings are as might be expected if one were exhausted, here again we have a more easy way of discovering the ailment—viz. that it is exhaustion; and we will apply the treatment likely to help exhaustion. Certainly in such conditions the signs do also afford some indication for diagnosis, but as regards the duration of the illness, the patient's habits in various respects, and his natural disposition—all these, it seems to me, can only be known by asking, and to know them is, in practice, more important than anything else.

[Further examples of the importance of asking questions. Internal and external causes of disease. Inquiry into dreams; their prognostic significance. Humoral theory of dreams.]

Further, the diagnosis of diseases is different according as they are of internal or external origin; and no doubt internal are more serious than external ailments. Thus, supposing our patient is tremulous: the tremor produced by cold or fear is less serious, while that from internal causes is more so. Or, if he is delirious, the delirium produced by strong drink or by some intoxicating drug is more easily healed; that otherwise produced is less so. Similarly in all cases you will find the method of treatment also to vary; where over-strain is present, one case being due to excessive exertion and another to surfeit, the former needs rest, sleep, gentle massage, and hot baths, while the other must work, must keep awake, and must be depleted in various ways. This shows how very important it is for the medical man to ask carefully also about causes; indeed it is impossible to know without asking. Hence even where signs are present one must ask questions. For example, where there is any lividity, one inquires whether this is not due to a blow, or to the patient's age, or to the time of year; for if it is not, and the lividity is due to fever, this points to a fatal termination. Or if the tongue is dry, we ask whether the individual is not suffering from thirst or has not been purged excessively; or if the tongue is black, we ask whether he has not eaten something black; such conditions as these would not give the doctor uneasiness. Similarly also one must inquire about the discharges in disease—about the urine, fæces, and saliva; this is of great importance as regards their quantity, their strength, and their colour, also to know what food produces them, its quantity, quality, and how often it is taken.

Inquiry must also be made about sleep; whether the patient has been sleeping or not; also what his usual habits are with regard to sleep and wakefulness, and whether he has any visions or dreams; even from these the doctor may draw conclusions. Now, one cannot write down all the details of every case, but only such as will make the argument clear and will remind the physician not to overlook any such matters. Thus, Myron of Ephesus, a wrestler, when apparently in good health, had the following dream:—he imagined himself to be lying the whole night in a black marsh filled with fresh water. On rising, he mentioned this to his trainer; the latter, however, attached no importance to it, and set him to his exercises. Myron was not half-way through these when he was seized with shortness of breath, feebleness, and

palpitation throughout the chest; then he became unable to move hands or feet or to speak, and not long afterwards he died. It seems to me he would not have died if he had had an intelligent trainer who could have managed to relieve him of a copious amount of blood, thus counteracting the strain. Another individual, suffering from an acute fever, used often to be visited in his sleep by a black man [lit. Ethiopian], who seemed to be wrestling with him and strangling him. The patient told his doctor about this dream, but the doctor himself had no idea what it could mean, until a violent bleeding took place from the nose, which spontaneously cured the disease. In the case of another man who dreamed that he was swimming in the river Cayster, his trouble became chronic and ended in dropsy. I am fully persuaded that ideas occurring in dreams, whether of good or bad significance to the individual, depend upon the humours in the body; and, further, that no full understanding of such ideas is possible without hearing what the patient has to say.

[Various further matters to be inquired about: *e.g.* hereditary factors; the previous treatment of the disease, both as regards regimen and drugs. Diagnosis of pain. Malingering.]

In regard to congenital diseases: it is surely not possible, is it, to find out about these in any way except by asking? Moreover, this could not be called a trivial inquiry, unless it is also trivial to determine what disease is easy to treat and what difficult. For it is justly believed that everything congenital is harder to cure than what is not.

Further, one must discover by inquiry any periodicity or transformations that the disease may have shown; in fact, all the symptoms that have previously occurred; this is of no small value in the consideration both of prognosis and treatment. Also one has to ask about the regimen that the patient has been following—not when he was well (for inquiry has already been made about this), but how he has been living lately, during his illness; also whether he has been taking any drugs; in fact, the whole course of treatment that he has been undergoing, and what has been the apparent effect on him of each item of it. To know such particulars is undoubtedly valuable for the purpose of properly ordering the present state without disturbing the past, and for discovering whether anything necessary has been omitted. One must also ask if the patient has taken food or not. Yes, I

maintain that even this is impossible to know of itself; although of all inquiries this seems the most ridiculous to the laity—that a doctor should not know as soon as he touches the patient whether or not he has been eating, but should need to ask someone else. Personally I believe that even this is impossible to make sure of without interrogation, as also the time when the patient took the food, its quantity and quality. If one judges by the strength or weakness of the patient, one will be frequently deceived; for often an individual who has had plenty to eat is not correspondingly strengthened, while another may be stronger from doing without food, and especially if his weakness comes from repletion. One must also ask what food pleases the patient best; this benefits him more than even the strongest food, since he digests it better than what he finds unpalatable. For we must not suppose that, while a disagreeably tasting article during chewing and swallowing impairs both of these two functions, it does not have the same effect during its digestion and distribution through the body. We also have to ask what articles of diet pass readily through the alimentary canal, what are voided by the urine, also what lead to acidity or do any other kind of harm. These are matters peculiar to each individual and are not of general application. Therefore I would commend the first doctor who happened to fall in with the patient if he did not attempt to discover the treatment entirely by himself, but asked advice from someone who knew the patient, especially if this were a doctor, but, if not, even a layman; in this way he would not fail to find the appropriate treatment.

We must also ask how much *pain* the ailment is causing. It is true that one can judge in other ways when a person is in pain—by his groans and exclamations, by his uneasy movements, his embarrassment, the posture of his body, his clenched hands. The painful part reveals itself at once; even the patient himself presses most upon the seat of discomfort; hence even in the case of dumb subjects one will not go wrong in thus estimating pain. But it is possible also to recognise suffering in a patient apart from his complaints; questions must also be asked. Yet even this is not quite enough for a complete diagnosis, since many people, owing to softness and effeminacy, are no more expert at imitating pain than the tragedians who weep and lament on our stage. Other things also must be considered; whether the individual is of sound mind, manly, and self-controlled; he at least will not tell lies

about his ailment. And since pains also have for the most part their varying phases, this must also be inquired about; for obviously we have not on the one hand to ask when other acute paroxysms occur, while yet leaving out of account periods when pains become exacerbated. It is also of some value to inquire into the natural condition of the patient's bowels, whether they move readily or not. And similarly with the other discharges; for sweating, micturition, and vomiting take place easily in some subjects, and with greater difficulty in others.

[Dog-bites and the necessity for asking questions about them if rabies (hydrophobia) is to be prevented. Bites inflicted by other animals. War-surgery; danger of fragments of weapons being left in the wound. Head-injuries, with risk of concealed fracture of skull; various factors involved here.]

These, then, and similar questions are what we have to ask in reference to the common and especially febrile diseases. Next as regards wounds: suppose we have to do with a wound made by the bite of a dog, we ask whether or not the dog happened to be mad; this is of great importance; in the one case some hæmostatic preparation or a sponge soaked in vinegar is enough, whereas in the other case, however small the wound may be, the cautery is necessary and the application of pungent medicaments; we must keep the wound open for a long time, we must give draughts of wormwood, aristolochia, Lycian thorn, decoction of river-crayfish, water-germander, rock-parsley, and the root called *gentian;* it is also of great value to purge with hellebore from time to time. If we do not do all this, there is a danger that the patient may go into convulsions, become mentally deranged, develop a fear of water " [hydrophobia "], and so perish miserably. I know at least of a man who was bitten by a mad dog, and who paid no attention to the wound although urged to do so by physicians and relatives. He died not long afterwards, with the symptoms characteristic of this disease; his wife also, who was three months pregnant, having had relations with him before the wound healed, herself developed a dread of water; hence, had I not quickly given orders for the embryo to be removed, I believe she would have suffered the same fate. As regards bites and wounds made by other wild animals, it is best for us to inquire into these also; we will cure them more easily by carrying out the treatment appropriate for each

before the symptoms appear. These, however, can also be judged by their symptoms, even when the person bitten gives no information. In the case of the dog it is impossible to judge before the disease develops.

As regards wounds received in war by spears and lances: the physician can easily recognise by sight or touch such weapons as pass right through, and such as remain buried under the skin; where, however, a weapon has been deeply buried and someone has already extracted it, we must ask whether he drew out the head also or merely the shaft by itself; even a person of great experience might fail to observe that the head had been left in the wound. For this reason physicians do well in advising soldiers that, when arrows have become lodged in their flesh, they should allow these to remain until they, the physicians, come to attend to them and to see that nothing is left in the wound—and at the same time giving them skilled treatment. It is also necessary, of course, to make preliminary inquiries about any preparations which may have been smeared on the arrows; many people have discovered drugs with which missiles are smeared, and which kill even when the wound is quite small; if we are aware of this beforehand, we can also at once prepare a remedy for any poison. This question, however, is not one to put to the wounded man, but to some prisoner or deserter or the like.

Also in injuries to the head similar inquiries must be made, and especially if there is no obvious damage to the bone, if the wounded man cannot speak, if he vomits—at first food or mucus, and afterwards bile—and then becomes acutely fevered and delirious; the danger here is that the bone may be fractured, either at the site of the wound or elsewhere. In other cases there is not even any wound, but the underlying bone is fractured, and the same symptoms occur as described. This at least was the case with the Samian; a native festival was being held, at which the people stood some distance apart and threw stones at one another. Here our man was struck, and, although he had no apparent wound, he lost the power of speech and became giddy; not long afterwards he seemed to be well, but on the twentieth day his mind began to wander. I was then summoned, and observed that he kept touching his head and was tremulous and wandering. I asked if he had ever been wounded on the head, and, when they replied in the affirmative, "Just so," said I, "the bone has been broken." Making now a large incision at the spot to which

he mostly put his hands, I found a minute area of bone broken. I then applied the treatment appropriate to fractured skull. That was what happened in this case.

One must further ask in a case of head-injury regarding the shape, size, and consistency of the missile; for, among weapons otherwise similar, those which are round, large, and hard are most apt to cause fracture, whilst sharp-pointed ones mostly rather produce wounds. We must also inquire how strong the man was who threw the missile, and with what energy he threw it; also whether it came from above or ricochetted. . . . Further, projectiles thrown by the sling are more forcible than those thrown by hand, while again engines throw them with the greatest force. Hence this point also must not be overlooked. Finally, one must inquire about the symptoms which followed the blow, as have been already described; if any of these supervene, we may be sure the bone has sustained some damage.

[Conditions peculiar to certain localities. Need of inquiring into the effects of different waters; endemic diseases such as that of the guinea-worm in Arabia, caused by drinking contaminated water. Methods of treatment peculiar to different places. Finally, a refutation of the charge that the writer's method is contradictory to that of the Father of Medicine; both methods have their value.]

Still other questions have reference to alien communities. For example, if one goes to a foreign country one must inquire what kind of water there is, and whether it has any outstanding properties, such as are often found. Thus some waters stimulate the bowels, others the urine; some are bad for digestion, others have a harmful effect on the liver and spleen; some give rise to stone in the kidneys and bladder, and others produce other results, both bad and good. Thus the water of Leontini in Sicily kills those who drink it, as also does that of Pheneus in Arcadia, the so-called Water of Styx; as for that of Clitorium in Arcadia, no one who bathes in it can afterwards bear the smell of wine; the water of Lyncestis has an intoxicating effect; that of Arethusa in Chalcis produces gout.

Regarding all the other qualities which are found in the various waters, in vegetable products, and under various climatic conditions, none of which resemble those ordinarily met with—about these we must learn by inquiry among the

natives, or else by prolonged personal experience. There is no other accurate method of discovery, since also the endemic diseases cannot be known in any other way. Among the latter there is much extraordinary to be met with in every land. Thus in the country of the Arabs there occurs an ailment, the "snake" disease, which in Greek is called a "sinew" (*neuron*). This "snake," as thick as the chord of a lyre, moves and turns about in the flesh like a reptile, and especially in the thighs and legs, but also in other parts of the body. Now, I have seen in Egypt an Arab with this complaint, who, when the animal was on the point of emerging, was seized with pain and became fevered; then a swelling formed like an abscess, which finally came through the skin, pointed, and suppurated away. These occurrences took place in the man's leg, but treatment was applied to the umbilicus, and in another case to the groin. When I asked if this disease was common among the Arabs, they said that, while Arabs suffer from it, many strangers also catch this malady from drinking the water, this being indeed the chief cause. One could find countless other investigations of this kind to make, if one were only anxious to discover the remedies peculiar to each place. For example, the Egyptians have their *syrmaisms*, their emetics and clysters; other people have their blood-letting, others their purging with hellebore.

My idea, then, is now clear for anyone who wants to arrive at it; yet no treatise would be adequate, nor would time be sufficient, for investigating and demonstrating the whole field; when the physician has discovered and set forth his main idea, this is all that is necessary.

And suppose someone says that my methods of inquiry are contrary to those of Hippocrates, who claims to have discovered the art by which a physician, on arriving at a city unfamiliar to him, may find out about the water, the seasons, the condition of the inhabitants' digestive organs, whether they are much given to eating and drinking, what diseases are ordinarily endemic, and how the women manage in childbirth; and there are various other matters which this authority undertakes to find out personally by means of his Art, without putting any questions to the natives [cf. "Airs, Waters, and Places," p. 51]. If, I say, anyone brings this forward and reproaches me for not agreeing with the greatest of physicians on such all-important matters, my answer is that I do not despise any of the work of Hippocrates; I certainly

hold that by his method also certain discoveries have been made about the state of the seasons, the constitution of the body, about various regimens, about the ordinary qualities and defects of waters and the general principles of disease. But I maintain that for diagnosis one also needs to procure information from the people of the place, especially in regard to anything strange and unusual in their countries. I admire Hippocrates unreservedly for his ingenious method; undoubtedly a great many fine discoveries have been made by it. At the same time I advise anyone wishing for exact knowledge in these various matters not to neglect the method of interrogation.

RUFUS OF EPHESUS

ANATOMICAL NOMENCLATURE

Introduction

[The following are some extracts from Rufus's treatise "On the Nomenclature of the Parts of the Human Body." He demonstrates to a student the names of the superficial parts, as seen on the body of a slave, and then those of the parts revealed by dissection, a monkey being used in this latter case. The extracts deal mainly with the eye, brain, and circulatory system; the nomenclature of the latter system may present some difficulty to readers unfamiliar with the "hepatocentric" theory of the blood movement. According to this, the portal vein brought nutriment from the food-canal to the liver, which worked this up into blood, thereafter sending it out to the tissues by the two "hollow veins" (*venæ cavæ*). One extract here well illustrates the fallacies springing from this false assumption; the inferior vena cava is looked on as two separate veins, running upwards and downwards from the liver.

The arteries, on the other hand, were believed to carry air only, bringing this to the tissues by way of the heart. They were indeed looked on simply as continuations of the pulmonary air-channels; hence, for example, the windpipe is called the "trachea-artery"—that is, the "rough artery." The "arterioid vein" of Herophilus (p. 128) is, of course, what we now call the pulmonary artery. Rufus looked on it as the vein which took blood to nourish the lungs, and he no doubt wondered why it looked like an "artery"!

The term "nerves," as will be seen, still stood for tendons as well as nerves proper (which, however, Rufus distinguished into sensory and motor).

A final extract deals briefly with the anatomy of the fœtus in utero.]

Greek text: Daremberg, ut supra.

In all the other arts does one not begin one's apprenticeship with the nomenclature?

. . . . . .

Are you prepared then, in medicine also, to begin with the names, first learning what each part of the body is to be called, and so on with the rest, in order?

. . . . . .

Listen then, and look at this slave, and you shall commit to memory first what is superficially visible. Next I will try to teach you what the interior parts are to be called, by dissecting some animal which is most like a human being. For, even if they are not alike in every respect, still there is nothing to prevent one from demonstrating at least the essentials of every part. In the old days these matters were demonstrated in a more noble fashion, on the human subject.

The largest parts of the body are head, neck, trunk (*thorax*), arms, and legs. For we give the name of trunk (*thorax*) not only to the parts from the collar-bones to the abdomen (*hypochondria*), but also the whole region down to the pudenda.

[Here follows nomenclature of head, scalp, temples, forehead, etc.]

. . . . . .

Between the pupil and the white of the eye is the iris; this is named according to its colour—black, tawny, bluish or brown.

A corona [*stephané*, ciliary muscle] runs round the dark part, and separates it from the white; this corona is a circle and connects together the tunics of the eye. Of these the first is of two kinds, and therefore has two names. The central part, extending as far as the iris, is called *keratoid* (horny); it looks like polished horn. The other part is called, in consonance with its appearance, the *white*, and does not resemble the middle part, either in structure or colour. Upon it lies the so-called *epidermis* [conjunctiva], which in the young and in the old, and in the condition called *chemosis*, stands out and becomes raised, and looks dark red.

The names of the other coats of the eye will be mentioned a little later, when we come to dissect the animal.

. . . . . .

Such then, young man, are the names to be given to the superficial parts, with the underlying bones. We shall now try, as we dissect the monkey, to put names to the parts internal to these. For the monkey comes nearest to the

human structure in his bones, muscles, viscera, arteries, veins, and nerves. Secondly come other many-toed animals. Thirdly, of the cloven-hoofed, those that have teeth in both jaws [*i.e.* non-ruminating]; those that have not teeth in both jaws and are solid-hoofed are furthest removed from man. . . .

. . . The upper surface of the brain is called "varicose" [*cirsoid*, *i.e.* convoluted]; that below and behind is the *base*. The outgrowth from the base is the cerebellum (*parencephalis*). The cavities are termed the "ventricles" of the brain. The tunic lining the ventricles internally is *chorioid* [*i.e.* resembling an after-birth or chorion]; Herophilus also calls it the chorioid membrane.

The processes springing from the brain are the sensory and voluntary nerves, through which feeling and voluntary movement—in fact all the activities of the body—are carried out. Some of these nerves also spring from the spinal marrow and the membrane surrounding it. All the marrow traversing the vertebræ is called dorsal and spinal indifferently.

Of the coats of the eye the first one apparent [*i.e.* without dissection] has been named *cornea* (keratoid, horn-like). As to the others, the second is called both *rhagoid* and *chorioid*, the part underlying the actual cornea being termed *rhagoid*, because it resembles from its outward smoothness and inward roughness a grape (*rhax*, *rhagos*), while that part under the white is called *chorioid*, because with its veins it resembles the chorioid (membrane) surrounding the embryo.

The third coat contains a glassy (*hyaloid*, vitreous) humour; its old name was *arachnoid* [like a spider's web] owing to its tenuity, but since Herophilus likens it to a drawn-up net, some also call it net-like [*retiform*, hence *retina*]; others name it *vitreous* (hyaloid) from the humour.

The fourth coat contains the crystalline humour; it originally had no name, but has more recently been called lentiform [*phacoid*, like a lentil] from its shape, and crystalline from the humour it contains.

. . . . . .

The whole length of the trachea-artery [lit. "rough artery"] is termed the "bronchus," and its outgrowths into the lung are called either bronchiæ, cavernous spaces, or aortæ.

The source of heat, of life, and of pulsation is the heart. Of this the upper part is the head, and the pointed extremity the fundus. Its cavities are the ventricles, of which the thicker one on the left is termed *arterial;* the thinner one on

the right, called the *venous*, is more capacious than the other. The soft wing-like cavities on each side of the head of the heart, which move when the whole organ pulsates, are its *ears* (auricles).

. . . . . .

To the right of the stomach (*cælia*) is the liver, and of this the surface in contact with the diaphragm and peritoneum is the convexity, while that below, in contact with the stomach, is the concavity. On the largest lobe is the bile-vessel, of which the middle part is narrow; the neck and the upper part is the fundus. The gate [*pyle*, Lat. *porta*] of the liver is the vein by which food enters [*vena portæ*]. . . .

. . . . . .

As regards the names of the other veins: speaking generally, vessels which have thin walls and contain blood are termed veins, and of these all the large ones are called hollow [Lat. *cavæ*]. In later times physicians have been accustomed to apply the term hollow to that vein which sends branches from liver to kidneys [inferior vena cava]. In this vein, Praxagoras says, is the primary source of fevers; he too calls only this vein hollow, whereas others give the name also to the upper one [really continuation of inf. v. c.] which proceeds through the diaphragm to the heart. Some call both this and the former vein by the one name *hepatic*, and that from the spleen the *splenic*. But the spleen, unlike the liver, has no veins passing up and down on the left side; so these authorities are wrong. The veins proceeding to the spleen are thin, and come to an end in the organ itself. . . . Herophilus gives the name arterial or arterioid vein to the large thick one which leads from the heart to the lung. For in the lung things are different from all other parts; the veins there are stout and closely akin to arteries in their constitution, whereas the arteries are weak and naturally very near to veins. . . . In the most ancient times arteries were called veins. When one said that the veins pulsated, it was the arteries that were meant; for pulsation is the function of arteries. They were also called aortæ, air-passages, cavernous passages, and nerves. Aristotle, however, gave the name aorta in particular to the very large artery which extends along the spinal column. . . . The hollow vessels traversing the neck were anciently called *carotids* [lit. "drowsy"] because, when they were pressed upon, people became stupefied and speechless; now, however, we realise that this is not an affection of the arteries,

but of the sensory nerves, which happen to be near. Hence if one cared to alter the name, one would not be in error.

Of the nerves (*neura*), those from the brain and spinal cord are termed active and sensory, voluntary and tensor, while those round the joints are ligaments. The thick growths extending from the nape of the neck and that which passes into the heel from the muscle are tendons.

. . . . . .

The fœtus is enclosed in membranes, of which one is thin and soft. This is called *amnion* by Empedocles, and from this, it seems to me, the goddess of childbirth, Ilythia, has been surnamed Amnias, rather than from the harbour in Crete. On cutting through this membrane I have found it full of a fluid much clearer than that in the chorion. It seemed to me, on reflection, to be as it were the sweat of the fœtus, whereas what passed through the urachus into the chorion was like urine. The amnion was inside, and round the fœtus, while the chorion was external, forming a rough, vascular coat, lining the uterus. From the chorion sprang the umbilical cord, consisting of two veins and two arteries, and a fifth structure, the so-called urachus, a short vessel open at both ends, and passing from the fundus of the bladder into the chorion.

These, then, are the names for most parts of the human body. Even if any have been omitted, it is not fair to despise the major part because of some small oversights.

GALEN

ON THE MEDICAL SECTS: FOR BEGINNERS

Introduction

[This is a valuable study of the views held by the three chief medical sects or schools of Galen's day. He says ("Notes on his Own Books," p. 175) that this is the first of his works which the medical student should study.

A short account of the main tenets of these sects has already been given in the General Introduction.

Galen obviously favours the orthodox or Dogmatic school; theory and reasoning (*logos*) appealed to him greatly. It is still more true, however, to say that he was an Eclectic and Synthetiser, and in the following pages we see him not only manifesting considerable sympathy with the Empiricists, but also showing a desire that they should ally themselves with the Dogmatists—if only to defeat the common enemy! For the present work is, in very large part, a polemic against these followers of Themison.

The Methodists were partly dogmatists and partly empirics, but they separated themselves sharply from the two schools bearing these names. They were typically empiric in that they rejected all research into causes, all anatomy, all considerations of time and place. They were dogmatists in that they professed a kind of pathology or *logos* of disease—their so-called "method"—which was, however, the product of an absurd and far-fetched simplification. Galen gave these *homines unius libri* short shrift, and in this book he "lets himself go" in characteristic style. The most telling arguments against Methodism (from the Dogmatic—that is, in fact, the Galenic—standpoint) are stated in Chap. IX; here the inadequacy of their outlook becomes clear, and we are reminded of the somewhat similar attack made by Hippocrates in "Ancient Medicine" on the nature-philosophers with their paltry theory of the "cold, warm, moist, and dry."

In favour of the Methodists it may be recalled that many of them were, in practice, better than their profession. Galen,

in fact, occasionally hints at this in the present treatise (cf. pp. 146, 150).

We have many "Methodists" in our own day, inside as well as outside the ranks of the "qualified." They, like ordinary doctors, have many cures to their credit, again probably because most of them are better than their theories. If experience does not in all cases prove sufficient to confute the latter, then the arguments used by Galen against the sectarians of his time may perhaps even to-day be usefully studied.

In the following pages the line of reasoning of successive chapters is summed up in a few lines at the head of each. The following is a brief summary of the general argument of the book:

After some preliminary definitions (Chap. I), the Empirical and Rationalist approaches are first stated separately (Chaps. II and III), and then compared (Chap. IV). It is shown that, although differing in point of view, yet in practice they are much the same. Some examples of their mutual criticisms are given (Chap. V). The Methodist standpoint is then brought forward (Chap. VI). Next a Methodist states his case as against the other schools (Chap. VII). The Empiricist answers him (Chap. VIII). Finally, the Rationalist disposes of him, and at considerable length (Chap. IX).]

Greek text: Marquardt's "Galeni Scripta Minora" (Teubner).

Chapter I

[Definitions. Medicine includes a knowledge of physiology as well as of pathology. Where to get this knowledge? By Experience or by Reasoning?]

The subject-matter of the medical art is health, and the attainment of health is its aim. Physicians must know by what methods health may be restored when absent, and conserved when present. Those things which bring about health where it does not exist are called medicines and remedies, while those which maintain it are called healthy modes of living. Thus also, according to an old saying, Medicine is the science of agencies healthful and harmful, the healthful being alike those which conserve existing health and those which restore it when deranged; while the harmful

are the opposite of these. The physician requires a knowledge of both, in order that he may choose the one group and avoid the other.

But it is not yet generally agreed whence he is to obtain this knowledge, some saying that experience (*empeiria*) alone is all that our art requires, while to others it seems that also reason or reflection [*logos*, Lat. *ratio*] has no small contribution to offer. Those that make experience alone their starting-point are, accordingly, called Empiricists, and similarly those who start from reason are called Rationalists.

These are the two primary medical sects, the one proceeding to the discovery of remedies by way of experiment (*peira*), and the other by way of indications.

Further, they have given to their sects the names Empiric and Rationalist, and they are in the habit of calling the Empiric sect observational and mnemonic, the Rationalist dogmatic and analogistic—the adherents, too, have been named in correspondence with their sects, those who attach themselves to Empiricism being called Empiricists, Observers or Recollectors of Phenomena [of " observed facts "], while those who accept reason are called Rationalists, Dogmatists or Analogists.

Chapter II

[The Empirical theory of the bases of Medicine. Accidental experience. Improvised experience. Thirdly, Experiment [*peira*], the main plank of the Empirical platform. The body of medicine is a collection of observations either of one's own [*autopsia, empeiria*], or including those of others [*historia*], and all controlled by experiment. The method called " transition from like to like," for discovering remedies; this needs particularly skilled experimental control.]

Now, the Empiricists for their part say that the medical art arose in the following manner. Many affections were observed occurring in people, some spontaneously, both in healthy and unhealthy subjects—for instance, a bleeding at the nose, an access of sweating, diarrhœa or any other similar affection, which might prove either harmful or advantageous, but which was produced by no obvious cause. Of others, again, the cause might be evident, albeit independent of any choice on our own part, and taking place as it were

by chance; for example, it might happen that when a person fell down, or was struck or wounded in any way, he would bleed; or, again, if sick, he might, in obedience to his instincts, drink cold water, or wine or the like, each of which things might prove either advantageous or the reverse. The first class of these beneficial or harmful happenings the Empiricists call natural, and the second, fortuitous. To one's first meeting with either of these the term *accidental encounter* is applied, from the fact of their occurring by chance, and independently of volition.

Such, then, is the *accidental* type of experience. What is called *improvised experience* is when one deliberately tests something that has been suggested by dreams or the like.

Further, there is also a third kind of experience, the *imitative*, in which something which, occurring either by nature, chance, or improvisation, has proved helpful or the reverse, is tested anew in the same diseases by *Experiment;* this it is upon which the art of the Empiricists is mainly based; for, after having imitated, *not once, nor twice, but repeatedly*, the treatment which proved salutary on a former occasion, and having found that, for the most part, it has the same action in the same affections, they give to the record of a fact like this the name *theorem*, deeming it now to be worthy of reliance, and to form an integral portion of the medical art.

And when they have gathered together a number of such theorems the whole collection is known as Medicine, and the collector as a physician. Such a collection is also called by them an *autopsy* [lit. " personal observation "], being, as it were, a record of things frequently observed to happen in the same manner. They also term it an *experience*, and the record of it a *history* (*historia*); the same thing, in fact, is an autopsy from the observer's point of view, and a history from that of the student to whom it is related.

Now, it sometimes happens that certain diseases are met with which have not before been seen, or which, though known, occur in countries where no remedies which have been experimentally tested are available; here the Empiricists invent an ingenious instrument for discovering cures, namely, the *transition from like to like* [a kind of analogy; *v.* Introd., p. 16]; by the use of this device they will often transfer the same remedy from one disease to another, or from one part to another; or they will pass from a remedy of which they have former experience to another which resembles it. Thus,

from one disease to another, as from erysipelas to herpes; from one part to another, as from the arm to the thigh; from one remedy to another, as from an apple to a medlar in the treatment of diarrhœa.

Now, every transition (*metabasis*) of this kind is a road to discovery, but Experiment is needed before it actually becomes a discovery; if one's expectation is brought to the test of experiment, then that which is demonstrated by the experiment is no less to be depended on than if it had been observed happening repeatedly in the same way. Now, this kind of experiment, which follows the transition of like to like, the Empiricists call *expert experimentation*, because he who wishes to make any discovery in this way needs to be well versed in the medical art. But all the preliminary experiments, which precede the Experience [or autopsy], those, namely, which are needed for the actual establishment of our art, may be carried out by anyone.

Such, then, is the road which leads to the goal of medicine by way of Experiment.

Chapter III

[The Rationalist or Dogmatist view of Medicine. Thorough study needed, (1) of bodily structure and function, (2) of environmental conditions, of habits as to food and drink, etc. Not enough to treat the proximate or determining cause (*aitia*). Other therapeutic indications got from the local condition (*diathesis*), from age, strength, and idiosyncrasy of patient, from meteorological conditions, etc. Remedies to be used appropriate to these. Example of treatment, taking various considerations into account.]

Now, the method which proceeds by way of *reflection* or *reasoning* advises a thorough study of the *nature* of the body which we are endeavouring to heal, as well as the properties of all those factors from daily exposure to which the body becomes of itself more healthy or more sickly. Next after this, they say the physician must be acquainted with airs, waters, localities [cf. Hippocrates], occupations, food, drink, and customs, so that he may discover on the one hand the causes of all diseases, and with respect to remedies on the other hand may be able both to compare their properties and to reckon how any given one of them, having such and

such a property, will, when applied to such and such a pathogenic factor [*aitia ;* cf. "ætiology"], have naturally such and such an effect.

Until he has a broad training in all these matters, say the Dogmatists, he cannot possibly have success with his remedies. For instance—in order that you may see the whole by means of a small example—suppose a part of the body to be painful, hard, resistant, and increased in bulk; here the physician must first investigate the cause (*aitia*) which has determined the inflow of fluid in abnormal quantity into the part, the latter being thereby swollen, stretched, and rendered painful. Next, if the fluid be still gathering, he must check it, or, if not, he must proceed to empty the part.

How, then, are you to stop the continued influx, and evacuate what has already collected? You will check the inflow by refrigerants and styptics, and you will empty the matter which has already collected by warming and relaxing the part.

Thus the Rationalists obtain from the condition (*diathesis*) itself the *indication* of the appropriate remedy; yet they say that this is not enough by itself, but that another indication is obtained from the strength of the patient, another from his age, and another from his personal nature; also that special indications for treatment are afforded by the season of the year, the nature of the locality, and from occupations and customs.

Thus—in order that you may learn this further point more clearly from an example—let us suppose an individual to be acutely fevered, shrinking from all movement, and oppressed by the weight of his body; suppose him also to be more congested and more red than usual, and even his veins to stand out more prominently. It is surely plain to everybody that such an one has a plethora of over-heated blood. What, then, is the cure? Clearly evacuation, since this is the opposite of plethora, and *opposites are the cure for opposites.* How, then, are we to evacuate this, and to what extent? This question cannot be determined by the [proximal] cause (*aitia*) alone; we must also have regard to the patient's strength and age, the season, the locality, and all the other considerations just mentioned. Thus if he be strong and in the prime of life, and if the season be spring and the region temperate, you cannot go wrong in opening a vein and letting out as much blood as the [immediate] condition (*aitia*)

demands; but if the patient be weak, or quite a small child, or a very old man, and if the region be a cold one, as in the neighbourhood of Scythia, or torrid, as in that of Æthiopia, and if the season of the year be either very hot or very cold—under these circumstances nobody would venture to carry out venesection. In the same way also the Rationalists bid us consider customs, occupations, and the physiological condition in each case, since from all of these is to be obtained a special indication for the appropriate treatment.

Chapter IV

[Comparison of Dogmatist and Empiricist. What gives the former his "indication," reminds the latter of a "frequent observation." Treatment same in both cases, only arrived at in different ways. Dogmatists may have to appeal to original (*procatarctic*) factors, *e.g.* was a bite poisonous? Empiricists arrive at same findings by observation. No proper reason for the two schools disagreeing, but they do.]

Now the same facts which provide the Dogmatist with an *indication* for treatment provide the Empiricist with his *observation*. For the aforesaid *group of symptoms* in the feverish patient (which it is customary to call a *syndrome*) suggests to the Dogmatist evacuation, but to the Empiricist a recollection of observations; for, having *often seen* evacuation prove beneficial in cases of this kind, the Empiricist hopes here also to use it with success; but also he knows from frequent observation that those in the prime of life stand without trouble the full amount of evacuation; so also, if it be spring-time rather than summer and the locality be a temperate one, or if the patient be at all accustomed to depletions, as, *e.g.*, from hæmorrhoids or bleeding at the nose—the Dogmatist would for this reason also draw off more blood, basing himself upon the *nature* of the case, while the Empiricist would do the same as the result of his *observations*.

In fact, speaking broadly, the Dogmatists and the Empiricists admit the same remedies in the same diseases, differing, however, in their mode of discovering these. From the appearance of the same physical *symptoms* there comes to the Dogmatists an *indication* of the cause, and from this again they arrive at the treatment, whilst to the Empiricists there

comes a *recollection* of similar observations which they have frequently made.

The Dogmatists, further, in those cases in which there is no symptom clearly demonstrating the [immediate] cause, do not hesitate to appeal to the so-called *procatarctic* (initial) cause [cf. pp. 143, 145]—as, *e.g.*, in the case of a bite, whether it has been caused by a mad dog, a viper, or the like; for the wound itself will at no time appear more different from other wounds than at just the very beginning; thus, while that caused by a mad dog appears the whole time similar to that occurring in those bitten by any other animal, that produced by a viper is, during the first few days, similar to others, but afterwards, when the case goes badly, certain fatal symptoms supervene all over the body. Such symptoms, indeed, as are produced by the so-called venomous animals, if not properly treated from the very beginning, assume an extremely fatal character. What, then, is the proper treatment? Obviously, to clear out the poison which entered the body of the bitten man at the moment of the bite; it is not right to attempt to hasten cicatrisation, or to close up the wound, but, on the contrary, to cut into it frequently, if it is too small, and, for the same reason, to use hot and pungent remedies, and such as are capable of drawing out and drying up the poison.

Now the Empiricists also use the same medicines; they are guided, however, to their discovery, not by the *nature* of the case itself, but by their *recollection* of what their experiments had made evident. Just in the same way that experience had been their guide to treatment where such things as age, season, or locality came into consideration, so it is also with what are called *procatarctic* factors.

If then the two parties but agreed with each other that *both roads* towards discovery were true ones, there would be no need for further discussion.

Chapter V

[Disputes between the two schools. Dogmatists say that Empiricism is inconsistent, inadequate and unscientific; Empiricists retort that Rationalism is nothing more than plausible; Epilogism versus Analogism.]

But since Empiricism is attacked by some of the Dogmatists as being inconsistent, by others as pointless, by others as

unscientific [lit. without *techné*], while again the Empiricists attack Rationalism as being plausible certainly, but not true, the result is that they each have a twofold argument which is elaborated at great length as they refute and defend each charge in detail.

Some of these statements have been made against Empiricism by Asclepiades when he demonstrates his belief that nothing can be seen happening repeatedly in the selfsame way, and he will have it, therefore, that Empiricism is altogether inconsistent, and insufficient for discovering the smallest fact.

Erasistratus, again, agrees that simple remedies for simple ailments may be discovered by experience—*e.g.* the fact that andrachne [*Arbutus andrachne*] is a cure for bleeding gums [in scurvy]; but not complex remedies for complex ailments; he holds that experience is not altogether unable to arrive at discoveries, yet maintains that it is not sufficient for everything.

Others, again, while admitting that such things are discovered by Empiricism, yet object to its indefiniteness, its length, and, as they say, its lack of method; contrasting it with Rationalism, which is neither inconsistent nor unreal, they look on Experience as something devoid of art (*techné*).

In answer to these assaults the Empiricists defend themselves by argument and try to prove that their system is consistent, complete in itself, and scientific, while in their own turn they attack in manifold ways Analogism; so that it becomes necessary for the Dogmatists again to reply to each kind of indictment. Thus, when the latter profess to understand the *nature* of the body, the origins of all diseases, and the properties of medicines, the Empiricists come to grips with them and urge against their whole teaching that, while it has reached a standpoint of plausibility and likelihood, it contains no real fundamental knowledge [*gnosis*, Lat. *scientia*]. Sometimes also, while admitting that it does contain knowledge, they try to point out the inutility of this; or, occasionally even yielding herein, they demonstrate the superfluousness of such knowledge.

Such, then, in general are what Empiricists and Dogmatists dispute about among themselves, and many particular arguments are used in each case. Thus, for example, in the inquiry into *hidden causes*, the one party extols *anatomy*, *the "indication"* and *the logical mode of approach* (these being to them instruments for the pursuit of obscure factors), whilst

the Empiricists do not agree that anatomy discovers anything, nor, if it did, that this is necessary to the medical art; also they maintain that there is absolutely no such thing as an "indication," and that nothing can be known from anything else [*i.e.* no "analogy": contrast p. 133], but that everything needs to be known of itself; also that there can be no *sign* from a thing which is by its nature hidden, and that no art has need of logic; nay, they even raise objections to the very postulates and definitions of logic; a "principle," they say, is no proof. Furthermore, they arraign the bad methods of proof which the Dogmatists are in the habit of using, also the whole method of *Analogism*; this, they say, is incapable of discovering what it pretends, no other art is based upon it, nor is human life advanced by it; the *Epilogism*, however, which they describe as a reasoning from *what is evident* [induction from *phenomena*, not from *principles*], is useful on the one hand for discovering *things which are temporarily hidden* (by this they mean things which *belong to the class of perceptibles*, but which *are not at the moment* apparent); this method is also useful for confuting those who venture to say anything against phenomena, for pointing out anything overlooked in the phenomena, and for meeting sophisms; at the same time it never deserts the obvious, but bases itself constantly on this. This does not hold, however, they say, of the *analogistic* method; beginning certainly with actual *phenomena* it proceeds to things which are entirely obscure; hence its multiformity, since, starting from the same phenomena, it arrives now at one of these obscure points and now at another entirely different. Here they (the Empiricists) employ the test of *the "insoluble discord,"* which, they say, is a sign of *incomprehensibility* [*acatalepsia*, cf. p. 16], for the true and fundamental knowledge they call *comprehensibility* [*catalepsia*, grasping, seizure, "catalepsy"], and its opposite incomprehensibility; they say that incomprehensibility is the cause of this insoluble discord, and the discord, again, a sign of incomprehensibility; that a disagreement over hidden matters is insoluble, but not so one over *phenomena*, for, in the latter case, *everything by appearing as it is* confirms those who are telling the truth, and confutes those who are in error.

Such are the countless points about which the Empiricists and Dogmatists dispute, while yet employing the same treatment in the same diseases—at least, those of them who have been trained in the traditions of either school.

Chapter VI

[The third or Methodist School. Their claim to have brought method or system into medicine. They consider in practice "the disease itself"—more exactly, the *disease-group* or "*community*." Three communities recognised, viz. obstruction, flux, and a mixed or "complected" kind of disease. The communities are not hidden principles but obvious facts (*phenomena*). Yet the Methodist phenomena are not those of the Empiricists, nor their indications those of the Dogmatists. Especially do they reject all environmental considerations [*i.e.* no "circumstances"]. Owing to this great simplification, the whole art of Medicine, it is claimed, can be learned in six months.]

Now, those called Methodists—for they give themselves this name on the ground that even their predecessors, the Dogmatists, denied using method in Medicine—the Methodists, I say, seem to me not only to dispute the ancient teachings in the matter of rationale, but to make many alterations in the actual practice of the art. They say, in fact, that nothing useful as regards *indications for treatment* is to be got either from the part affected, the immediate cause, the time of life, the season or locality, nor from an investigation of the patient's strength, nature, or bodily habit. Further, they will hear nothing of *customs*, but they affirm that they derive sufficient indication for treatment from *the diseases themselves*—and these not considered each as a separate entity, but on more broad and general lines. Moreover, they give the name of "*communities*" to those same general principles, which pervade all particular conditions; and they try to demonstrate that there are merely two such communities and a third or mixed kind—some say only in those diseases which come within the province of regimen, and others say in all diseases. To these communities they give the name of *obstruction* [*stegnosis*, "stoppage"] and *flux* (*rhysis*); every malady, they say, is either obstructed or fluent, or else a combination of the two. If the natural evacuations of the body are checked, they call this an obstructed condition, and if they are escaping somewhat too freely, they call this fluent; when they are both checked and fluent, they say that a complex [*epiploké*] exists; thus, for instance, in an eye which is at once inflamed and discharging, they say that, since inflammation, which is

" a disease of obstruction," occurs here not by itself but simultaneously with and in the same place as discharge, this makes the whole process a " complected " disease.

Now the remedy indicated in diseases of obstruction is relaxation, and in the running ones constriction. For example, they say that, if the knee be inflamed, we must relax it; if the bowels or eye be running, we must check and repress them. In complected states we must stop the more urgent of the two elements; it is, in fact, the one which is giving the most trouble and which involves danger—that is, the stronger one—that must be opposed rather than the other.

Why, then, do they not call themselves Dogmatists, seeing that they obtain remedies from *indications?* " Because," they say, " the Dogmatists search for *hidden* principles, whereas we confine ourselves to *appearances*." Indeed, they define their teaching in its entirety as " a knowledge of *visible communities*." And in order that this definition may not seem to include all other arts (for they hold that these others, too, are sciences of visible communities), they have also added, " which follow the aim of medicine." And some of them add not " which follow," but " which harmonise with "; most combine the two and say that Methodism is a knowledge of the visible communities which follow and harmonise with the aim of medicine; others, such as Thessalus, say, " which border upon, and are necessary for health." This, therefore, is the reason why they hold that they should not be called Dogmatists—they have no use, like these, for hidden causes—nor Empiricists, even though they busy themselves mainly with the phenomenal—for they differ from them on the subject of indications. Nay, even in regard to their manner of attending to the phenomenal they deny that they agree with the Empiricists; for the latter avoid hidden causes on the ground that they are *unknowable*, while the Methodists themselves do so because hidden causes are *useless;* from phenomena the Empiricists draw an observation, and the Methodists an indication.

In these respects, then, they say that they differ from each of the other two, but particularly in that they reject season, locality, time of life, and all such considerations, which they hold to be obviously useless and only considered out of respect for the physicians of an earlier time. They even say that this is the greatest advantage of the Methodist school, and it is

on this that they pique themselves and consider themselves deserving of admiration; for this reason, also, they find fault with him who said that life is short and the Art [of medicine] long, and maintain exactly the opposite—that the art is short and life long; for, when we have set aside everything which has been falsely supposed to help our art, and when we have regard only to the "communities," then medicine is neither long nor difficult, but quite easy and clear, capable, in fact, of being entirely mastered in six months; for thus there has been collected into quite a small space the whole problem of diseases which come within the province of dietetics; and the same thing has been done with those treated by surgery and drugs; in all of these departments, in fact, they endeavour to find their communities, and the provinces which they assign to remedies are so few in number that it seems to me the whole art might be learned, not in the much-talked-of six months, but even much more quickly. Hence they deserve to be thanked for the conciseness of their teaching if they are not mistaken, but, if they are, then they deserve censure for their levity.

Chapter VII

[Closer examination of Methodism. The Methodist first states his case. His scorn of all kinds of causation.]

I shall now say how I think one would seem best to judge whether the Methodists are blind to what is *useful* or are unique in avoiding (as one ought to do) what is *superfluous*. Indeed, this would appear to be a question of no small magnitude; they seem to me not to confine themselves to words, like those Dogmatists and Empiricists who contend about the original discovery of remedies, while all the time they agree regarding their actual employment. No, the very practice of our art must either be greatly damaged or greatly helped by the Methodist teaching.

Now, there being a twofold method of judging things, that from reason alone, and that from what can be clearly seen, that from reason alone is too much for beginners, so this is not the time for it. The other one, however—that from appearances—is open to everybody. What is there to hinder us, then, from using this first, obvious as it is to beginners and at the same time held in esteem by the Methodists themselves?

For it is the phenomenal [the apparent] whose praises they sing, in season and out of season, and to which they give precedence in every case, whereas they say that what is hidden is entirely useless.

Come, then; let us first consider the so-called *procatarctic* [original or initial; cf. p. 137] causes, taking *the phenomenal* as our standard of judgment.

First we may suppose that the Methodist appears, and speaks to the following effect:—"Why on earth do you make all this useless ado, you Dogmatists and Empiricists, about chills, over-heating, drunkenness, and indigestion, excess and want, toil and idleness, kinds of food, and changes of habits? Do you propose to leave aside the bodily states and to treat these factors I mention, which in the first place are not even present, but have themselves disappeared? Their *effect*, on the other hand, persists in the body, and it is this which should be treated; this, in fact, is what constitutes the affection (*pathos*).

"What we have to do, then, is to find out what kind of affection it is. Thus, if it be *obstructed*, we must relax it; if *running*, we must check it; and this quite irrespective of the cause from which either condition has arisen. *What matters the cause*, since a running disease never needs relaxation, nor an obstructed one inhibition? Surely it matters absolutely nothing, as the facts themselves show."

In a similar way the Methodists reason about the causes which are called obscure and *synectic* [maintaining]; these also, they say, are beside the mark; the affection indicates its own appropriate treatment, irrespective of whether the cause from which it originated be known or not.

And with the same kind of reasoning they pass on to the question of *season*, *locality*, and *age of patient*, expressing surprise that, in these matters, too, the ancient physicians were oblivious to so plain a fact. For since inflammation, say the Methodists, is an obstructed disease, it certainly does not need laxatives in the summer only, and something else in the winter, but the same remedies at both seasons; nor does it need laxatives at the period of childhood and obstructives at a more mature age; nor laxatives in Egypt and inhibitives at Athens. And as against inflammation, a fluent disease never requires laxatives but always astringents, whether the season be winter, spring, summer, or autumn, and whether the patient be a child, or in the prime of life, or an old man;

whether he be in Thrace, in Scythia, or in Ionia. Thus none of such considerations, they say, is of any use at all, and all this trouble is perfectly futile.

What about the parts of the body? Of a certainty, say they, a knowledge of these is also useless towards discovering indications for cure. For, will anyone venture to say that an inflammation in a tendinous part must be relaxed, and in an arterial, venous, or fleshy part obstructed? In fact, should there be an obstructed condition in any part of the body, would anyone venture to say that this should not be relaxed, or, if a flux, that it should not be checked?

Seeing then that the nature of the part makes no difference in the mode of treatment, and the discovery of appropriate remedies follows from the kind of disease, therefore the examination of the part is obviously useless.

Such, then, in general terms, is the standpoint of the Methodist.

Chapter VIII

[The Empiricist's answer to the Methodist. *You do not really respect obvious facts* (*phenomena*); let me remind you of some. In case of a dog-bite, there is *an observed need* of knowing whether the dog was mad, and, if so, of employing tried remedies for this. Similarly, *observation* shows that we must consider the patient's age, the climate, country, the part of the body and even the particular state of that part of the body. Yet you pay no attention to these, hence your claim is false that you respect phenomena.]

Enter next after him the Empiricist, speaking somewhat as follows:

For my part I know nothing more, nor do I profess anything more profound regarding phenomena than *what I have often seen.* If, of course, you despise the phenomenal (as I seem once to have heard some sophist say), then it is time for us to pass on to those who respect this same phenomenon, and you can be allowed your Cadmean victory. But if, as I heard you remark at the very beginning, you maintain that hidden causes are entirely without importance, while you confess to following *what is clear and evident*, perhaps by reminding you of some phenomena I may show you what you have overlooked.

Two men, having been bitten by a mad dog, went to their usual doctors and demanded treatment. The wound in each case was small, so that the skin was hardly even broken. The one physician accordingly treated merely the wound and did not trouble himself about anything else; for a few days the part appeared normal. The other doctor, however, *when he learned that the dog had been mad* [cf. Rufus of Ephesus, p. 120], so far from hastening cicatrisation of the wound, on the contrary kept enlarging it by the use of strong, acrid applications, for a considerable time; meanwhile he made the patient drink drugs which, as he said, were a cure for madness.

Well, then, what happened to them both in the end was as follows: the patient who took the medicine was saved and recovered his health; while the other, who thought he had nothing wrong with him, suddenly developed *a dread of water* [" hydrophobia "] and died in convulsions.

Do you then think that it was useless in these cases to search for the *procatarctic* (initial) cause? Did this man die for any other reason than the negligence of his physician in failing to make inquiry about the cause, and not employing the *treatment which had been observed to be efficacious* in such cases? Personally, I can see no other reason, and, since I am a follower of the phenomenal, I cannot pass by any such factor.

Similarly, I cannot omit nor overlook *the patient's age ;* for here too I am compelled to credence by *observation*, since the same diseases do not always call for the same treatment, but this sometimes differs so much at different ages that it is not merely in quantity and mode of administration, but in quality, that the remedies have to be altered. Thus I have many a time seen even you Methodists bleed pleuritic subjects when they were robust and in the prime of life, but neither you nor anyone else has ever dared to let blood from the veins of a very old man or a quite small child.

When Hippocrates says, " Before and during the dog-days drugs are badly tolerated," and again, " In summer it is better to treat the upper parts, in winter the lower," does he seem to you to be speaking truth or to be mistaken? I think that whichever answer you give you will be wrong. For if you say he is mistaken, then *you neglect what is apparent* (the phenomenal), although you pretended to respect this. For the truth is *clearly seen* to be as Hippocrates says. But if you

say he speaks the truth, then you admit the importance of seasons, which you declared to be irrelevant. I do not think you can ever have gone very far from home, nor have had much experience of difference of countries; otherwise you would have been well aware that those who live in northern regions cannot bear frequent depletions of blood, and similarly also those in Egypt and all southern parts, whilst those between these countries often quite obviously get great help from venesection.

And for you to say that *not even the parts of the body* are to be considered seems to me a very strange thing—in fact, extremely foolish; it is not only opposed to truth, but also in direct opposition to your own actions. In the name of the gods, does an inflammation require the same treatment in whatever part it occurs, whether in the leg, the ear, the mouth, or the eyes? Why, then, have I often observed you treating inflammations of the leg by incisions with a knife and then saturation in olive-oil, while you have never done so to the eyes? And why do you treat inflamed eyes with astringent drugs, although you never apply these to the legs? And why do you not treat inflamed ears with ophthalmic remedies, and eyes with remedies for the ears? The fact of the matter is, of course, that there is one kind of drug for inflammation of the ears, and another for that of the eyes. Thus, vinegar with oil of rose is a good medicine for ear inflammation, but I hardly think anyone would venture to instil this into inflamed eyes! I am very sure that, if he did, his daring would bring upon him no small retribution! And a good treatment for an inflammation of the uvula is the fruit of the Egyptian thorn [*Acacia arabica*, astringent], as also fissile alum; are they good, then, as well for inflamed eyes and ears? or is the fact not quite the contrary—that they are extremely harmful?

While saying all this, I agree with your first proposition, that it is right to relax an inflammation in the legs or arms; but not one in the eyes, uvula, or ears. But if I remind you that *not in all circumstances* are even inflammations of the legs or arms to be relaxed, perhaps you will have the sense to realise the extent of your error. Here, again, it will be a question of recollection of *things seen* (*the phenomenal*), for when inflammation occurs in any part, not as the result of a wound, but automatically in the presence of *the so-called plethoric condition* [*diathesis*], nobody would relax the part before *evacuation of the whole body* had been carried out; for if you did, you would

not merely not lessen but would even increase the existing inflammation. Thus, in this case we apply styptics and refrigerants to the part, and after we have evacuated the whole body, then precisely will the inflamed part also admit of relaxation.

And if I fail to persuade you in saying this, then, as I remarked at the beginning of my talk, I shall have to betake myself to *those who do respect phenomena.*

Chapter IX

[The Dogmatist now joins in, also attacking the Methodist. If Experience is not enough to confute you, then let Reasoning be added. You Methodists disagree among yourselves as to whether your "communities" consist in actual *bodily states* [*diatheses*], or in the condition of *the natural discharges*. Let supporters of the latter view remember that evacuations may be abnormal in quantity or even in kind, and yet quite salutary. And will supporters of the former view explain why they call the bodily conditions "obvious"? And how can such obscure matters be learned in six months? Need of all kinds of ancillary studies. Methodists will not define their terms. Proper explanation of inflammatory discharges; not due merely to state of "pores," but to the amount and consistency of the contained fluid, the state of the surrounding parts, etc.; sometimes *nature* will *itself* evacuate a collection of fluid.]

When the Empiricist has thus spoken, we may next imagine the Dogmatist coming up and speaking thus [to the Methodist].

Perhaps you have sense to realise that enough has been already said, and that neither the patient's age, nor the season of the year, nor the place, nor yet the original cause, nor the part of the body is unimportant. But if the Empiric has not yet persuaded you by drawing your attention to *observed facts*, and if you want, over and above this, some *reasoning* [*logos*], I will produce some, and will show that the fundamental postulate of your teaching is unsound.

I hear you speaking about a knowledge of certain visible "communities," but when I ask in each case wherein the community itself consists, and how we are to recognise it, I do not seem even yet to have found out. And the reason is, that, so far as words go, you are in agreement with each other,

but that you differ over facts. For certain of you estimate obstructed and relaxed conditions by *the natural discharges*, calling the disease obstruction when these are checked, flux when they are secreted immoderately. Others of you, on the other hand—a by no means small party—say that the diseases are in the actual conditions [*diatheses*] of the body, and they severely censure those who look to the evacuations.

Perhaps, then, I might now say in what way they both seem to me to be wrong. Let us suppose our argument to be directed first against those who judge diseases by *the natural discharges*. They astonish me if they have never seen sweatings, urination, vomiting, or defæcation occurring in greater quantity than normal in disease and yet *having beneficial results*. Most remarkable of all is it if they have never observed a crisis brought about by nasal hæmorrhage, a condition which is contrary to nature not merely quantitatively but qualitatively; on the other hand, sweatings, urination, or discharges from the bowel or stomach are not in kind contrary to nature, though they are sometimes so immoderate *in quantity* that I have seen some people sweating so as to saturate their bed-clothes, and others passing over 30 cotylæ [15 pints] from the bowel; yet there seemed no reason to check either of these conditions, seeing that offending matter was being eliminated. And yet if one were to take the natural evacuations as one's criterion in every case, one would have to put a stop to such symptoms [cf. p. 185].

Those, therefore, who suppose the communities to be the actual *bodily states*, seem to me to speak somewhat more plausibly; still even they surprise me in that they venture to call these things *obvious* or *apparent*. For if the "flux" is not what runs from inside the body, but is the bodily state determining the running, and since it is impossible that this state could be *perceived by any of the senses*, how then can the communities still be looked on as *apparent?* For obviously it is possible for the state of flux to be in the colon, or small intestine, or somewhere about the jejunum or stomach or mesentery, or in various other internal parts, none of which parts, nor their diseases, are appreciable to the senses. How, then, are the communities still going to be called apparent—unless, indeed, one is prepared to give the name of appearance to what is recognised by *signs* (*sēmeia*)*?* And if so, I fail to see in what way these people differ from any of the old physicians.

And how is it that they announce that they will thoroughly teach the art of Medicine in six months? It is, surely, no trivial method that they would require in order to know anything about *those things which evade the senses;* indeed, he who is going to do this properly needs both anatomy (which teaches the nature of each of the internal parts) and no small acquaintance with general physics, in order to find out also the function and utility of each part. Until these facts about the deeply situated parts of the body have been discovered, it is impossible to diagnose the diseases of any one of them. It is hardly necessary to say that there is also great need here of *logic*, in order that you may see clearly what conclusions can be drawn from what premisses, and that you may not be led astray either by anyone else's quibbles or by your own (for, indeed, we sometimes unwittingly deceive even ourselves by sophistries!).

Moreover, if they have learnt the art of dialectic, I should like very much to ask them what sort of thing this *flux* of theirs is. I do not consider the definition given by some of them sufficient, namely, that the flux is a certain state contrary to nature; for if we are not to be told *what kind of state* this is, we should be no nearer knowing whether it is a condition of relaxation, softness, or looseness of tissue.

You will never hear them committing themselves plainly to any one of these definitions, but they use whichever one happens to occur to them, now this, now that, and often all together, as though there were no difference among them. If anyone attempts to teach them in what way the one condition differs from the others, and to point out that each needs its own special treatment, they not merely refuse to listen, but they even cast up against the ancients that they made such distinctions in vain. Such is their indifference regarding the search for truth.

Nor will they listen to the statement that the opposite of the relaxed state is the contracted, of the soft the hard, of the loose the dense, that the checking and flowing of the physical discharges is something quite different from all these—moreover, that they have all been clearly defined by Hippocrates.

Not only do they make the most reckless statements concerning the conditions mentioned, but they give, quite off-hand and without examination, the name "obstructed" disease to an inflammation (for so they term a hard, resistant, painful, and hot swelling). Then, again, other inflammations they call

" complected," such as those in the eyes when they are discharging, and those in the tonsils, uvula, palate, or gums.

Then *they postulate ducts or " pores,"* some of which become dilated, others closed, and in this way they suppose that the two kinds of disease are brought about; some, indeed, do not hesitate to say that both flux and obstruction may be set up in one and the same duct—an idea not even easy to imagine! To such a pitch of presumption they have come.

A few of them, however, who have managed to bear hearing more about all these matters, and to look more thoroughly into them, occasionally (albeit with some difficulty) change their minds and turn to the more truthful view. For these, and for such people as want to learn with some exactness about *the primary classes of disease*, I have written privately. But at the present moment, since it is useful for beginners, I am bound to say a few words to them, and I would pray that the Methodists, too, might benefit therefrom; this will happen if they give over contention and look carefully for themselves into the rationale [*logos*] of the matter.

Now, this is as follows: that which they themselves call an inflammation is an abnormal, painful, resistant, hard and hot swelling, which does not *of its own nature* make the part either denser, looser, or harder, but which is filled with an excess of fluid and is therefore stretched. Yet, although it is stretched, it does not thereby become denser or harder. You may see this in hides, in leather thongs, or in horse-hair ropes, if you try to put great tension on them.

Thus also the cure of congested parts is evacuation, this being the opposite of congestion—and as soon as the parts are emptied they become relaxed. Thus as relaxation occurs in evacuated parts, so necessarily in congested parts there occurs tension, but *not necessarily constriction or openness of pores, nor yet flux or stoppage.* For if the part be loose and open in texture, even then it is not necessary that there should be any discharge from it; for *what if the contained matter be thick in consistency and small in quantity?* Nor, if the part be dense, is there necessarily inhibition of any discharge, for *if the content be thin and abundant* it will flow out even though the pores be narrowed. Even the Methodists, then, would have done better to have read the books of the ancients and learnt how many ways there are whereby that which is pent up in a part becomes eventually discharged; this may result either from its surroundings becoming slacker, or from the

contents themselves becoming thinner, or more abundant, or being subjected to more violent movement, or being attracted by something from without, or forcibly reabsorbed as it were by something from within. And if anyone were to overlook all these possibilities and *suppose that there is only one cause for evacuation*—namely, an *openness of the pores*—he would seem to be unacquainted even with *obvious phenomena.*

We often see earthenware jars so porous that the water percolates through them; but if you pour in honey, that does not pass through; the substance of the honey is too thick for the pores of the vessel.

Nor, again, is it unreasonable to suppose that certain substances run through owing to their tenuity, even when the containing body is not perforated.

Nor yet, again, is it difficult for one closely conversant with the medical art to imagine that often *the governing nature* (*physis*) *of the animal*, making a somewhat forcible effort, may, by a sort of squeezing and expulsive movement, evacuate all that is in excess; this is the usual sort of way in which the crises of diseases come about. . . .

ATOMIST AND VITALIST SCHOOLS OF THOUGHT IN MEDICINE

("Natural Faculties," I, 12)

Greek text: Loeb edition, 1916.

[Here we have the rival schools of Epicurean Atomism and Hippocratic Vitalism contrasted, Galen obviously favouring the latter, while Asclepiades stands as the representative of the former. Hippocrates and Galen stress the essential unity and continuity of the Organism, the correlation, humoral and pneumatic, of its parts, its self-maintaining and race-maintaining faculties, its powers of selecting and rejecting nutriment, its prevision for the future, its "initiative" in general. Asclepiades and the materialists, on the other hand, hold that all life is purely a question of physics; to them the Organism either does not exist, or at least is purely passive—a "symptom" of the clashing atoms; their psychology is pure sensationalism, their divinities are the "absent gods" of Epicurus and Lucretius.]

Speaking generally, there are two main schools [sects, lit. *heresies*] in medicine and philosophy who have made any pronouncement about the nature of man. I refer, of course, to those who know what they are talking about, and who see and adhere to the logical outcome of their assumptions. As to those who have no idea of this, but who give utterance to any nonsense that comes to their lips, and belong definitely neither to one school nor the other, these do not even need to be referred to.

What, then, are these two schools, and what is the outcome of their assumptions? According to the one, all substance liable to genesis and destruction is supposed to be at once united and capable of alteration, while, according to the other, it is changeless, unalterable, and cut up into minute particles, with empty interspaces between.

And therefore all who appreciate the logical sequence of an assumption judge, in accordance with the second school, that there is no essence or force peculiar to [man's] nature (*physis*) or soul (*psyche*), but that those are produced by the coming together of the aboriginal impassive corpuscles. According to the first-mentioned school, on the other hand, the physis is not secondary to the corpuscles, but a long way prior to and older than they. Hence also, in these people's view, it is the physis which puts together the bodies of plants and animals by virtue of the faculties which it possesses—certain of these being attractive and assimilative of the appropriate, and others expulsive of what is foreign; thus it skilfully moulds all things and brings them to birth. And when they are born it provides for them by the use of, again, other faculties —one of affection and provision for offspring, one of companionship and friendship for kin.

According to the others, however, none of these faculties exists in our natures, nor is there in our minds any inborn original idea either of logical sequence or conflict, of separation or synthesis, of justice or injustice, of beautiful or base. Everything, they say, comes to us from sensation and through sensation; living things are steered by images as it were, and by memories. Some of these people even literally declare that our minds have no power of reflection, and that we are led like cattle by our sense-impressions, being unable either to refuse or assent to anything. Obviously, according to their argument, courage, intelligence, prudence, and self-control are all pure nonsense; we love neither each other nor our

offspring, nor do the gods care anything about us. These people despise dreams, birds of presage, omens, and the whole of astrology. . . .

Those, therefore, who wish may consider which of these two paths lying before us is the better to follow. Hippocrates took the former one. According to it, substance is a unity and is susceptible of change; there is a consensus in the flow of air and liquids throughout the body; the physis performs everything skilfully and justly, by virtue of the faculties which it possesses, drawing to itself the appropriate juice, applying this to every part of the body, and completely assimilating it; while by another, an eliminating force, it expels that part of the juice which has not been mastered and is incapable of undergoing entire alteration and assimilation to the nature of the parts receiving nourishment.

(*Ibid.* I, 13.)

Now Hippocrates, the first of physicians and philosophers whom we know, was apparently also the first to recognise the operations of the *physis* or nature. He admires her and constantly sings her praises, terming her "just," and maintaining that she alone is sufficient for all living beings; for she does everything of herself and instinctively [lit. "untaught"]. He supposes her, being such, to possess certain powers or faculties, one of which is attractive of the appropriate, and another eliminative of what is foreign, and by these he supposes her to nourish the living being, to make it grow, and to remove its diseases by crisis. This is his reason for saying that there is in our bodies a consensus in the flow of airs and liquids, and that everything is in sympathy.

According to Asclepiades, on the other hand, nothing is naturally in sympathy with anything else, and all substance is broken up into inharmonious elements—his absurd "molecules."

GALEN'S RELIGION

("On the Utility of Parts," Book III, Chap. X.)

Greek text: Kühn, Vol 3.

[Here the *physis*, which we have hitherto known mainly as the animating principle of the living part or individual, becomes a World-Soul, a Creator. Galen insists that this

same artistic and demiurgic power is seen in the development of the individual *ab ovo* as in the disposition and ordering of the mightiest heavenly bodies.

In judging a work of art, he reminds us, it is not the material used but the workmanship which we must consider; the sculpture of Phidias affords an illustration of this. Further, the final cause must never be overlooked—"Nature does nothing in vain," and none of her works could possibly be conceived better than it is.]

This work is a veritable hymn which I compose to the power that made us (*demiurge*). And I hold it to be true piety not that I should sacrifice to him innumerable hecatombs of oxen, nor burn abundance of myrrh and cassia, but that I should first myself realise, and then show to others how wise he is, how powerful, and how good. For his wish to bring the whole cosmos into order and to debar no one from its benefits—this I hold a proof of his absolute goodness; for this, then, let us praise him as good. Again, that he should have found out how best to order everything is a proof of his perfect wisdom. And, finally, that he should have carried out everything as he willed is a proof of his invincible power. Do not wonder so much, however, that the sun, the moon, and the whole host of stars have been well stationed, and be not so much amazed at their size, their beauty, their incessant motion, the regularity of their courses, that things compared with them may seem small and unadorned; for here as well you will find a similar wisdom, power, and forethought. Consider, I beg of you, the matter from which each part arises, and do not rashly expect that from menstrual blood and semen an immortal animal can be produced, as serene, as ever-moving, as bright, or as fair as the sun; but examine the art of him who fashioned all these in the same way that you judge the art of Phidias. Perhaps you are amazed at the representation of Zeus at Olympia, at the glittering ivory and abundant gold all around, or at the magnitude of the whole statue? And if you saw this made of clay, you would probably scorn it and pass it by? But the artist (*technites*) would not act so, nor he who knows how to judge an art by its products; he praises Phidias equally whether he sees the work executed in paltry wood, in any chance stone, or wax, or even clay. The ordinary man (*idiōtes*) marvels at the beauty of the material, but the artist (*technites*) at that of the art (*techné*) itself.

Come, then, do you also make yourself familiar with the works of Nature (the *physis*), that we may call you no longer an ordinary man, but a "naturalist" ["physi-ologist"]. Rid your mind of the differences in material, and look at the pure art itself. If it be the arrangement of the eye that you are considering, remember that this is an organ of vision; if it be a foot, that this is an organ of progression. And if you would wish to have the eyes made of the sun's substance, and to see in the feet unalloyed gold, not bones and skin, you have forgotten from what matter these arise.

. . . . . .

The foot is a small and modest portion of the animal—who will deny it? The sun is great; it is finer than anything else in the universe; this too we know. Consider, however, this: where ought the sun to have been stationed in all the universe, and where the foot in the animal? The sun ought to have been placed midmost among the wandering stars in the universe, and the foot lowest of all things in the body. How is this clear? Imagine each of them in another position, and consider the result. If you put the sun lower, where the moon now is, everything would be burnt up. And if you put him higher, in the region of Mars or of Phæthon, no part of the world would be habitable owing to the cold. As regards the size and nature of the sun, then, in so far as it is solar, this is a matter belonging to itself alone; but that it was stationed in the midst of the universe is the Creator's work. For being of the size and nature that it is, you could find no better situation for it in the universe. But, again, neither could you find for the foot any situation in the animal's body better than its present one. Note the same artistic placing in both cases. For it is not at random that I compare the noblest of heavenly bodies to the most modest of all parts of the animal. What is more petty than the heel? Nothing. Yet it could not be placed better anywhere else. What more noble than the sun? Yet neither could this be better situated in any other part of the universe. The universe is the greatest and finest thing that exists. Who denies it? But the ancients who were familiar with nature held that the animal itself was, so to speak, a little universe. In both you will find the Creator's wisdom equally manifested.

Show me then, says someone, the sun in an animal's body. What is that you ask? Would you have the sun generated from a septic and filthy substance like blood? You are mad,

poor wretch! This, and not abstention from sacrifice or incense-burning, is true impiety. I would never show you a sun in an animal's body; I would show you an eye, the most brilliant and sun-like organ that exists. I will also demonstrate to you its position, its size, and its shape, and everything else about it. Further, I will show that everything in it is so well disposed that it could not possibly be better otherwise.

JUNCTION OF THE OPTIC NERVES

("On the Utility of Parts," Book X, Chap. XII.)

Greek text: Kühn, Vol. 3.

I have now said almost everything about the eyes. There is, however, one thing, which I had intended to leave out, for fear the obscurity of the argument and the length of the treatise might annoy the majority of people. For it is here necessary to deal with mathematical considerations, of which not only the majority of so-called educated people are ignorant, but which even repel and annoy real savants; hence I thought it better to omit the subject altogether. Meantime, however, *I had a dream*, in which I was upbraided for doing wrong to the divinest of our organs, and for sinning against the Creator (*Demiurge*) by omitting to explain this great example of his forethought for living things. This, then, persuaded me to resume the omitted task and to add it at the end of the book.

The sensory (*æsthetic*) nerves, which pass downwards from the brain to the eyes, are also named "ducts" by Herophilus, since it is only in them that the passage of the *pneuma* is appreciable and clear. Apart from this fact, which is in itself remarkable and does not apply to other nerves, we have the fact that these optic nerves arise from different localities, run forward and unite together, and then again separate and split into two. For what reason, then, has Nature not made their superior origin from one and the same place? And again why, when the one arises on the right and the other on the left, does she not lead them straight towards the eyes, instead of first diverting them inwards, connecting them together and uniting their ducts, and thereafter again leading each of them straight to the eye towards which it was at first directed? For Nature has not interchanged them, directing that on the right to the left eye, and that on the left to the

right, although the shape of these nerves is exactly like the letter X, and anyone dissecting them carelessly might think they change places and cross over one another. This is not so, however. Having met inside the skull and united their ducts, then again straightway they become separated, showing clearly that they approximate their ducts for no other purpose than for conjunction. Now what end does this serve, and how far is it useful to the organs of vision? *Since some dæmon has commanded me to say*, I will obey him. And first I will appeal to all who read these lines, and who, being properly educated in geometry as well as in other subjects, know what a circle is, a cone, an axis, and so forth—I will appeal to them to wait a little and to allow me, for the sake of the much larger number who are ignorant, to explain as shortly as possible what is meant by these terms. . . .

[Here follows the demonstration, with geometrical diagrams.]

WHY ARTERIES ARE JOINED TO VEINS

("On the Utility of Parts," Book VI, Chap. XVII.)

Greek text: Kühn, Vol. 3.

[Here we have a good example of how Galen sometimes squares facts to fit theories, and sees things which he wishes to see. He begins with a characteristic tilt at his old enemy Erasistratus, who thought that the "synanastomoses" between arteries and veins only functioned under pathological conditions (cf. p. 15). He then tries to explain the undisputed fact that blood is found in the arteries in health—mixed, of course, with the *pneuma*. By comparing the relative sizes of vessels entering and leaving the heart, he concludes that some part of the blood brought to the right side of the heart (by the vena cava) passes over to the left side by way of perforations (which he sees, or half-sees) in the interventricular septum! (Elsewhere, *e.g.* in "Natural Faculties," III, IV, he goes into more detail about these perforations, fossæ, or stomata in the septum: what he saw were probably recesses between the columnæ carneæ. Cf. also p. 29 *supra*.)

The reason for the "clear, thin" portion of the blood thus passing through to the left ventricle was, in Galen's opinion, to nourish the psychic *pneuma*. Nature could not have done anything in vain!

It may be mentioned that Galen's belief in the permeability of the interventricular septum was first definitely denied in the sixteenth century by Vesalius, while Servetus suggested the pulmonary circulation as an alternative method by which blood might get from the right to the left side of the heart.]

Almost everybody agrees that, if certain important arteries are wounded in sufficient numbers, blood is evacuated through them. For this reason also even those people who, like Erasistratus, do not allot any blood at all to the arteries, yet agree that they anastomose with the veins. In other words, although they think that Nature does everything *artistically*, and nothing in vain, yet they fail to realise that they are confessing that these anastomoses have been made for no purpose!

Yet by itself the fact that they were constructed in vain and are of no use to the animal would have been a small matter. But there is a fact more serious than this, and which one cannot any longer consider a small mistake on Nature's part; in other words, they admit logically that besides being no use, the arteries actually do a great deal of harm! Thus Erasistratus himself is at pains to point out to us the impossibility of any inflammation ever occurring without penetration (*paremptosis*) of blood from the veins into the arteries. Well then, if it is impossible for inflammation to occur otherwise, living beings would no longer be troubled by pleurisy, nor phrenitis, nor peripneumonia, if these anastomoses were done away with! Nay, there would be no ophthalmia nor quinsy nor angina if these did not exist. And of course there would be no inflammation either of the liver, the stomach, the spleen, or anything else. What more? Most of the worst diseases would no longer occur were there none of these anastomoses, created by the providence of Nature not to perform any useful function for the animal, but destined to be merely organs of deadly disease! Nor, of course, would inflammation follow wounds if the anastomoses were not there, nor would fever supervene upon plethora, nor would inflammation occur in the liver, the alimentary canal, the heart, or in any of the other organs where it most quickly causes death!

Now I have already discussed not merely once or twice, but many times and in many ways, the hypothesis of Erasistratus about the arteries, to show how far this contradicts and is opposed to an obvious fact, and I think it superfluous to go into the matter here. For Nature (the *physis*) has not created

the anastomoses of arteries with veins idly or at random, but in order that the benefit derived from respiration and pulsation may be distributed, not only to the heart and arteries, but also to the veins. I have written elsewhere about the amount of benefit they thus receive; for our present purposes it is enough to know the facts.

And, further, the fact lately mentioned, that all parts of the body do not require the same nourishment, itself shows the value of vessels of different origin. If there was only one kind of vessel—the blood-vessel—all parts of the body would have similar nourishment. Now this is quite unreasonable—in fact it is absolutely absurd—that the same blood should be used as nourishment of, let us say, both liver and lungs, that is the heaviest and densest of the viscera as against the lightest and most spongy. This is why Nature has very properly made in living bodies not arteries only, but veins as well. And hence the liver is nourished by veins alone, and by the very finest and most permeable of these, and the lung by arteries; indeed the veins of the lung, in so far as they provide nourishment, also resemble arteries.[1] We must admire therefore the forethought of Nature in providing vessels of two kinds, and in anastomosing their adjacent ends with each other—and even before that, in doing the same thing with the cavities of the heart. . . .

The fossæ which appear on the septum in the middle of the heart exist to subserve the communication of which I speak. For in any case it would be better for the arteries to receive the blood which has been previously elaborated in the veins; then the veins would be in the same position with respect to the arteries as the stomach is with respect to the veins. For logically it is not impossible that the psychic pneuma is a kind of exhalation of useful blood. This also has been discussed at greater length elsewhere. Enough for our present purpose to mention the value of the arteries containing clear, thin blood which is destined at least to nourish the psychic pneuma.

All these, then, are strong proofs of how well Nature has done to provide these two kinds of vessels. And, furthermore, there is the fact that the arteries need a certain strength—in fact, a coat—as they have to be in constant motion. Now this coat cannot be strong and thin at the same time, while, if it

[1] He is thinking of the pulmonary artery and its branches, which was supposed to be a vein providing the lung with nutrient blood (cf. Rufus of Ephesus, p. 128 *supra*).

becomes thick, many parts of the body would not be suitably nourished.

Nature, then, has very properly made all these arrangements throughout the body, and first of all in the heart itself, where it has devised a communication of veins with arteries by means of these narrow openings (*stomata*). For the same reason the vein [vena cava] opening into the heart is greater than that proceeding from it [pulmonary artery], although the latter vein receives the blood poured into it by virtue of the heart's heat; since a great deal of blood passes through the intervening septum and its fossæ into the left ventricle, it is natural that the vein proceeding to the lung should be smaller than that which brings blood into the heart. And similarly also the artery [pulmonary vein] which brings the pneuma from the lung to the heart is itself much smaller than the great artery [aorta] from which all the arteries throughout the body arise, since the great artery receives some blood from the right ventricle, and is destined to become the source of all the arteries of the organism.

ON ANATOMICAL PROCEDURE

[In his book "On Anatomical Procedure" Galen is more the unprejudiced observer, whereas in that "On the Utility of Parts" he too much feels himself called on to be the apologist of Nature. The present is no place for going into detailed anatomical description, but the extracts from two chapters of the former work here quoted afford interesting glimpses of the spirit with which our author prosecuted his anatomical studies, as well as of the methods and material which he used.]

Greek text: Kühn, Vol. 2.

Book I.

Chapter II

What tent-poles are to tents, and walls to houses, so to animals is their bony structure; the other parts adapt themselves to this, and change with it. Thus, if an animal's cranium is round, its brain must be the same; or, again, if it is oblong, then the animal's brain must also be oblong. If the jaws are small, and the face as a whole roundish, the muscles of these parts will also necessarily be small; and

similarly, if the jaws are prominent, the animal's face as a whole will be long, as also the facial muscles. Consequently also the monkey (*pithēcus*) is of all animals the likest to man in its viscera, muscles, arteries, veins, and nerves (*neura*), because it is so also in the form of its bones. From the nature of these it walks on two legs, uses its front limbs as hands, has the flattest breast-bone of all quadrupeds, collar-bones like those of a man, a round face and a short neck. And these being similar, the muscles cannot be different; for they are extended on the outside of the bones in such a manner that they resemble them in size and form. To the muscles, again, correspond the arteries, veins, and nerves; so these, being similar, must correspond to the bones.

. . . . . .

First of all, then, I would ask you to make yourself well acquainted with the human bones, and not to look on this as a matter of secondary importance. Nor must you merely read the subject up in one of these books which are called by some "Osteology," by others "The Skeleton," and by others simply "On Bones," as is my own book; which, by the way, I am certain is better than any previously written, both as regards the exactitude of its matter and the brevity and clearness of its explanations. Make it your earnest business, then, not only to learn exactly from the book the appearance of each of the bones, but to become yourself by the use of your own eyes an eager first-hand observer of human osteology.

At Alexandria this is very easy, since the physicians in that country accompany the instruction they give to their students with opportunities for personal inspection (*autopsia*). Hence you must try to get to Alexandria for this reason alone, if for no other. But if you cannot manage this, still it is not impossible to obtain a view of human bones. Personally I have very often had a chance to do this where tombs or monuments have become broken up. On one occasion a river, having risen to the level of a grave which had been carelessly constructed a few months previously, easily disintegrated this; then by the force of its current it swept right over the dead man's body, of which the flesh had already putrefied, while the bones were still closely attached to one another. This it carried away down-stream for the distance of a league, till, coming to a lake-like stretch with sloping banks, it here deposited the corpse. And here the latter lay ready for

inspection, just as though prepared by a doctor for his pupil's lesson.

Once also I examined the skeleton of a robber, lying on a mountain-side a short distance from the road. This man had been killed by some traveller whom he had attacked, but who had been too quick for him. None of the inhabitants of the district would bury him; but in their detestation of him they were delighted when his body was eaten by birds of prey; the latter, in fact, devoured the flesh in two days and left the skeleton ready, as it were, for anyone who cared to enjoy an anatomical demonstration.

As regards yourself, then, even if you do not have the luck to see anything like this, still you can dissect an ape, and learn each of the bones from it, by carefully removing the flesh. For this purpose you must choose the apes which most resemble man. Such are those in whom the jaws are not prominent nor the canine teeth large. In such apes you will also find the other parts as in man, whence they walk and run on two legs. Those of them, again, that are like the dog-headed baboons (*cynocephalæ*) have longer muzzles and large canine teeth; they have difficulty in standing upright on two legs, let alone walking about or running.

But even those apes most like human beings fall somewhat short of the absolutely erect posture. In them the head of the femur is adjusted somewhat obliquely to the hip-socket, and certain of the muscles which run down to the tibia come far forward; both of these factors impair or prevent assumption of the erect posture, as also do their feet, for in these the heels are somewhat narrow and the toes widely separated from each other. These, however, are small matters, and so the ape comes very near being able to stand erect.

Those monkeys which resemble the dog-faced baboons and have a marked divergence from the human type show also as clear difference in their bones. Choose, therefore, among the monkeys the most men-like (*anthropoid*), and learn accurately on them the nature of the bones, comparing them with my writings. You will also have to accustom yourself without delay to their names, as these will also be useful in learning the anatomy of other parts.

Thus if you should also later meet with a human skeleton, you would easily recognise and remember everything. If, on the other hand, you content yourself with reading only, without familiarising yourself beforehand with the sight of the

ape's bones, you will neither recognise accurately a human skeleton if you suddenly see one, nor will you be able to remember it; for in order to keep in mind sensible facts, constant familiarity is needed. This is the reason why also among men we quickly recognise those with whom we have often had to do, whereas if we see a person only once or twice and meet him again after any length of time, we pass him by, failing entirely to recognise him or even to remember our previous meeting. Consequently also the far-famed "fortuitous anatomy" to which some physicians pay honour is not an adequate way of learning the nature of the parts visible. We must have plenty of leisure to inspect each of the parts first, so that, when suddenly seen, it may be recognised. And this should be done preferably with actual human beings, and, if not with them, then with animals like them.

Now, in the epidemic of carbuncle (*anthrax*) which occurred in many towns of Asia, a large number of the sufferers had parts of their body stripped of its skin, while others even lost the flesh itself. I was personally at this time still living in my own country, being taught by Satyrus, who was already passing his fourth year with Costunius Rufinus, the constructor of our temple to Zeus Asclepius. Quintus, the teacher of Satyrus, had died shortly before. Now, those of us who had seen Satyrus dissecting any of the denuded parts, readily recognised them and made a complete diagnosis, telling the patients to make some movement which we knew to be carried out by such and such a muscle, and sometimes diverting or drawing aside the muscles in order to observe an adjacent large artery, nerve, or vein. We saw that all the other physicians were like blind men, without any knowledge of the parts which were exposed, and that hence they did one or other of two things; either they lifted up and pushed about many parts of the muscles that had been stripped, thus giving the patients much distress and unnecessary annoyance, or else making no attempt at all to do anything. For those who were accustomed knew better how to tell the patient to move the part in the appropriate way.

So I saw clearly from all this that to those who have had some previous instruction the inspection of wounds provides a confirmation of what they have learned, whereas to those with no previous knowledge it cannot teach anything at all.

But to return to the subject in hand. We must, as I say, study all the bones, either in the human body or, if possible,

in the ape, but preferably in both. Then next we proceed to dissect the muscles. For these two parts [bones and muscles] underlie all the others, like foundation-stones. After these you may learn whatever you like first, whether arteries, veins, or nerves. While engaged in the dissection of these you will also learn about the [solid] viscera. Next will come a knowledge of the intestines, of fatty tissue, and of glands; and these, again, must be each examined separately in greater detail.

For practice, then, you will do best to proceed in this order. For the purposes of demonstration, on the other hand, one must lay bare as quickly as possible the part with which one proposes to deal, and then demonstrate it from various points of view, beginning now here, now there, as I shall show.

When apes are not available, one should be prepared to dissect the bodies of other animals, distinguishing at once in what ways they differ from apes. These differences I shall also point out.

Chapter III

As I say, I have already written a special description of the bones. This book must first be read, in order to be familiar not only with the structures of which it treats, but also with their names, so that I shall not be forced to explain these when they happen to occur in the course of the argument.

Not long ago also I wrote a special anatomy of the muscles, being constrained to this by my friends, in order that they might have memoirs when they went away. . . .

Whoever wishes, then, can practise from this book, during his dissection of the ape. He will also learn in further detail from this what procedure is needed in dissecting each special part of the muscles.

Practise first on a dead body, in order to know the origin and insertion of each muscle, and also to see whether all its longitudinal fibres have the same appearance or differ in structure. Thus you will find in some muscles the fibres single, in others double, so that they look like several muscles superimposed, and others again have their fibres the reverse of longitudinal. All these observations will be useful to you in surgery as well as in the investigation of functions. For in surgery we are sometimes forced to cut even the muscles themselves, on account of deep-lying abscesses, deposits, or

suppurations. And it is most useful to learn the function, so that in the case of extensive injuries (*traumata*), where a whole muscle has been cut across, we may know beforehand what function is lost; by forecasting this you will avoid being blamed by censorious individuals (who are in the habit of referring loss of function to the doctor's treatment and not to the original injury).

GALEN'S ETHICS

[The treatise "On the Passions," from which some characteristic passages are here extracted, corresponds in many ways with the "Golden Book" of Marcus Aurelius, the author's royal patron. The outlook in both books is definitely Stoic in spirit, although undenominational in letter.

Galen's theme is the purging and sublimation of our passions. Stress is laid on the ordinary man's inability to discover all his own weaknesses, and consequently on his need for a mentor or confessor. Our author has much to say about bad temper, no doubt his own besetting sin. The mother, however, of all the evil passions he believes to be inordinate or insatiable desire, *pleonexia*, *aplēstia*—what is translated "covetousness" in the New Testament.

In this treatise, as contrasted with that on "Mental Faculties and Bodily Constitution," we see what is in the individual's own power, how he is able to withstand circumstances, including inherited weaknesses. Galen's ideal man is the "*kalos kagathos*," which I have here baldly translated "perfect"; the Greek words mean one who has by long practice (*askēsis*), attained perfection both of character and of "style"—a "gentleman" in the best meaning of that term.

Besides hints on adult re-education and self-education, we are also given some useful remarks on the teaching of children. As so often, Galen illustrates his thesis by personal reminiscences.]

Greek text: Teubner's "Galeni Scripta Minora."

We each need a Mentor

Whenever men apply for an estimate about themselves to others, we see few mistakes made, but when they suppose themselves perfect without referring the judgment to other people, then they go very far wrong. Thus I thought in my

boyhood that praise was needlessly given to the Pythian injunction, " Know Thyself," for this seemed to present little difficulty. Yet later I saw that praise was here justly bestowed. For it is only the wisest man who can know himself accurately.

Whoever then wishes to become perfect must realise that he necessarily is ignorant of many of his own faults; this is the only way to discover them all.

As Æsop used to say, we have two bags hung round our necks, the one in front being that of other people's affairs, and that behind of our own, and hence we are always looking at other people's affairs and are constantly unaware of our own. And all people accept this as a true argument. Further, Plato gives the reason for what happens. " The lover," he says, is blind to what he loves." If then each of us loves himself most of all, he is necessarily blind about himself.

Since mistakes occur from *wrong judgment*, and passions from an *unreasoning impulse*, it seems to me that one should first free one's self from passions, for it would appear that these also make us judge wrongly. Now, the passions which we all recognise are temper, anger, fear, grief, envy, and extreme desire. In my opinion also to love or hate anything excessively is a passion.

It is agreed that judgment can be exercised by someone else who is neither loved nor hated by you.

If you see a man who neither converses with, nor dances attendance on, nor dines with the powerful or rich, and who lives in a modest way, then, in the hope that he may be a truth-teller, you must try to arrive at a deeper knowledge of what sort of man he is—and such knowledge comes from fairly long association. If you find such a man, speak to him some day in private, and ask him to point out frankly which of the above-mentioned passions he finds in you. Say that you will be under the greatest obligation to him, and will judge him your saviour even more than if it had been your sick body that he had saved. . . .

And at the beginning, even if on careful examination you find that he has accused you maliciously and falsely, do not believe that you have made no mistakes, but apply to yourself that first precept of philosophy, to be " patient under insult."

Also as time goes on you will understand and know, even without the aid of these people, all the errors you had previously fallen into.

Each of us needs practice (*askēsis*) almost throughout life

in order to become a perfect man. One must certainly not cease from making one's self better even if one be fifty years old, so long as one yet feels that one's mind has not been incurably and irremediably damaged. For even if one's body were in a bad condition, at the age of fifty, one would not surrender to this *cachexia*, but would certainly try to improve it, even if unable to acquire the *euexia* of a Hercules. Let us not either, then, ourselves abstain from improving our minds even if we do not acquire the mind of a sage. Yet even this we shall have best hopes of getting if we begin providing for our minds in childhood; and if not, let us at least consider how not to become altogether base in soul, as did Thersites in body.

Bad Temper

As a youngster I once happened to see a man opening a door in a hurry, and when things did not go as he wished, he bit the lock, kicked the door, and reviled the gods; his eyes became wild like those of a madman, and he almost foamed at the mouth like a boar. At this I took such a hatred against temper as to wish never to be seen disgracing myself in one.

Restrain and hide your anger within yourself. For though one cannot become void of anger by the mere wish, one can control the unseemly manifestations of this passion.

Do this often, then, and you will yourself some day realise that you are less easily roused to anger than formerly, so that neither great nor small matters excite you. For so it comes to be later that one does not get angry even in the most horrible circumstances, if one keeps the resolution that I as a boy made to myself and have kept throughout life—never to lift my hand to any of the slaves. Both I and my father practised this . . . and he censured many of his friends who bruised their hands by striking slaves in the teeth; he said they deserved to die in convulsions from the resulting inflammation.

I have also seen a man in anger hit his slave in the eye with a reed-pen, such as we use in writing. And it is said that the Emperor Hadrian once struck one of his attendants in the eye with a stylus, and when he realised that the man had lost his eye from the blow, he called for him, and allowed him to ask a gift from him in recompense for his suffering.

And when the sufferer kept silent, Hadrian again asked him to say what he wanted. Then the man took courage and said he wanted nothing else than an eye. For what gift could replace the loss of an eye?

A Personal Experience

I should like also to remind you of one of my own experiences, although I have often spoken of it already. On my way back from Rome I had as fellow-traveller a friend belonging to Gortyn in Crete. While in other ways this man was of some note, being simple, friendly, upright, and liberal in his daily expenses, yet he was so hot-tempered that he used to hit his slaves with his own hands, and sometimes to kick them, although he much preferred to use a strap or any chance piece of wood. Now when we were in Corinth we made up our minds to send all the luggage and the slaves from Cenchreæ to Athens by boat, while we hired a vehicle and proceeded by land through Megara. And while we were passing through Eleusis and had reached the Thriasian (plain), my friend asked the slaves who were following him about some luggage; they were unable to answer. Enraged at this, and having nothing else to strike the young fellows with, he seized a large sword enclosed in its sheath, and brought it and the sheath together down on the heads of them both. Nor did he strike with the flat of it—this would have done no great harm—but with its edge. The sheath was instantly cut through and a large double wound produced on the head of each slave, for he struck both of them twice. And when he saw the blood flowing freely, he left us, and went away rapidly towards Athens, lest either of his slaves should die in his presence. So we took them both safely into Athens. And our Cretan friend, condemning himself, took me by the hand into a certain house, presented me with a strap, took off his clothes, and bade me flog him for what he had done under the compulsion of " his accursed temper " (for so he termed it). I naturally laughed, but he fell on his knees and besought me to do this. It became clear then that the more he made me laugh the more urgent he became in his entreaties that I should flog him. Since these proceedings were taking a considerable time, I promised to thrash him if he also would grant me one very small request. And when he promised this, I asked

him to give me his attention while I put a certain argument to him; this, I said, was my request. On his agreeing, I gave him a fairly long talk, pointing out that it is of course by reasoning, not by blows, that we have *to school the irascible element in us.*

This man then, after keeping watch on himself for a year, became much better. In your case also, even if you do not become much better, you can at least be satisfied with advancing a little towards betterment in the first year. For if you continue checking your passion and calming your temper, you will make a considerable advance in the second year. Then, if you still continue watchful of yourself, you will feel still more in the third, and thereafter in the fourth, fifth, and succeeding years, great progress towards dignity of life. It is shameful that while one has to labour for many years on end in order to become a good doctor, orator, grammarian, or geometer, yet, owing to the length of time involved, one never chooses to labour in order to become a good man.

Anger and the other Passions

To be one's self free from anger when all men are angry, what else is this than to show one's self better than all other men?

Perhaps you wish to be considered better, yet not actually to be better; as if one were anxious to be thought physically well although he was really ill? Or do you not consider passion to be a disease of the mind? Do you think the ancients were wrong in giving the name passions to the following five:—grief, anger, temper, desire, fear?

My own view at least is that in order to be largely free from the said passions, far the best plan is, firstly, when rising from bed to think over the day's duties, and to consider whether it is best to live enslaved to the passions or to apply reason to everything; secondly, to consider that whoever wishes to become perfect must appeal to somebody who will point out to him every detail in which he is at fault; finally, he must have at hand every day and hour this teaching—that it is better to respect one's self than even perfect people.

But, further, without having somebody to point out our errors it is impossible for us to be cured; in fact we must

look on the man who brings to light all the mistakes we have committed as our saviour and our greatest friend.

You will come to tame and dominate the unreasoning force of the irascible principle, which is like a wild beast within you. Would it not be a serious matter if, while horse-trainers take useless horses and in a short time make them submissive, you, dealing not with some animal outside yourself, but with an irrational force inside your own soul, where reason always dwells with it, should not manage to subdue it—I do not say quickly, but even in a considerable time?

You may consider that what has hitherto been said about temper has also been said about the other passions. Firstly, that the diagnosis of these must be entrusted to other people, not to ourselves. Secondly, that it is not any chance person to whom this oversight can be given, but people of mature age who are acknowledged to be perfect, and whom we ourselves have chosen mainly on account of their being free from passions. And finally, when such persons say anything about our faults, we must show ourselves not annoyed, but grateful.

For it is not enough to be rid of anger; we must also purge away the love of delicate feeding, lust, drunkenness, meddlesomeness, and envy.

The Young Man with Great Possessions; a Talk on Education; Nature and Nurture

A young man, one of my most intimate acquaintances, who had told me that he was not worried by trifles, later realised the truth, and, coming to me at daybreak, said he had not slept the whole night; he told me he kept remembering that I did not trouble myself so much about the most important matters as he himself about trifles. He wanted to know how this came about—whether from practice, from consideration of principles, or because I had been born so. Well, I told him the truth. Certainly, I said, nature conduces much in childhood to a full life, as later on do teaching and exercise. That our natures differ enormously may be clearly realised by comparing children. We see some of them always bright, others sullen; some ready to laugh at everything, others to cry on the smallest provocation. Again, some share everything, others are selfish. Some get into a temper on the most trivial pretexts and, thinking they have been wronged, avenge themselves on their neighbours by biting, kicking, or

using sticks and stones. Others are patient and gentle, and never cry or become angry unless they are very badly used. Thus in Eupolis we read that Aristides the Just, when asked by Nicias, "How did you become just?" replied, not irrelevantly: "My nature was the most important thing, and next I zealously co-operated with my nature."

Now, some readily receive proper education, while others get no benefit from it, yet children must not for this reason be neglected, but must be brought up in the best manners. Then, *if their nature admits* benefit from nurture they will become good men. . . . The management of a child is somewhat like the care of plants. In the latter case no gardener will ever be able to make a bramble-bush bear grapes, since its original nature does not allow of such a consummation. On the other hand, if vines, when ready to bear fruit so to say of their own accord, be neglected and left to Nature alone, then they will bear either poor fruit or none at all. And similarly with animals; train a horse, and you will make it useful in many ways, but a bear, even if it appear to be tamed, yet has no stable character; while an adder or a scorpion will never even advance so far as to seem tame.

Galen's own Nature and Nurture

Now, personally I cannot say how I got my nature (*physis*). It was, however, my great fortune to have as my father a most good-tempered, just, efficient, and benevolent man. My mother, on the other hand, was so irascible that she would sometimes bite her serving-maids, and she was constantly shouting at my father and quarrelling with him, worse than Xantippe with Socrates. When I saw, then, the nobility of my father's conduct side by side with the shameful passions of my mother, I made up my mind to love and cleave to the former behaviour, and to hate and flee from the latter. And besides this enormous difference between my parents, I observed that he was never depressed over any affliction, while my mother became annoyed at the merest bagatelle. You yourself doubtless know that boys imitate what they are fond of, and avoid what they do not like to see.

So much then for the upbringing given me by my father. And when I had nearly completed my fourteenth year, I began to attend the lectures of philosophers in the town,

especially the student Philopator, a Stoic, and also a Platonic student, Gaius; I was with the latter, however, only for a short time, as he had no leisure, being pressed into a busy political life by his fellow-citizens because he was the only person who seemed to them just, superior to money considerations, approachable, and gentle. And besides him another of our citizens arrived from a long stay abroad, a pupil of Aspasius the Peripatetic; with him came from Athens another, an Epicurean. My father made on my behalf an investigation into the life and principles of all of these, he himself going with me to them. He himself had been chiefly trained in geometry, arithmetic, architecture, and astronomy, and therefore he wished me also to learn the use of geometrical [methods of] demonstration. . . . "You must not," he said, "proclaim yourself in a hurry as belonging to any one school; you must go on for a long time learning and testing them, striving after justice, moderation, courage, and intelligence."

. . . . . .

These injunctions which I received from my father I cherish to this day: without proclaiming myself the adherent of any sect, I persevere zealously in the investigation of my father's precepts, and continue like him unshaken by the vicissitudes of everyday life. Nor is the loss of anything sufficient to trouble me, unless it might be the loss of all my property—an experience I have never yet had. Reputation and honours my father accustomed me to despise, giving reverence to truth alone. I observe that most men are distressed when they think themselves looked down on by somebody, or when they have lost money. You have never seen me distressed for the former reason, and up to now I have never incurred so great a financial loss as to be unable to attend to the hygienic needs of my body with what remained; nor have I suffered loss of civil rights, such as I see many incur at the hands of the Senate.

For this was the first definition which my father laid down of such possessions, that they are for preventing hunger, cold, and thirst. And if, he said, there were more of them than sufficient for this, they should be employed in noble pursuits. Personally up to now I have had so much available that they have also sufficed for such pursuits. As regards yourself, said I, I know that you have twice as many possessions as I, and enjoy full civic honours in our town, so what causes your trouble, unless it be insatiate desire (*aplēstia*), I cannot see.

Galen Points out to the Young Man his Faults

I notice indeed that you do not venture to lay out anything in things of beauty, in the buying and collecting of books, or in the practice of writing, whether for speed by signs, or for beauty and accuracy, nor again in reading correctly. And I certainly do not see you, as you see me doing, from time to time sharing with some your clothes, with others even nourishment or invalid food; and sometimes you have even seen me paying people's debts for them. Thus I am leaving behind almost the whole capital that my father left me, and I am not laying up any of it uselessly, nor depositing many times as much as I spend. Yet you would not say that I am often worried, and, as you confess, you have never seen me actually depressed.

Insatiability and Self-Control

Know that there is one cause for all kinds of mental depression, and that this is called by the Greeks sometimes *aplēstia* (insatiability) and sometimes *pleonexia* (inordinate desire).

It is much better to possess self-control (*autarkeia*), which *is in your power*, whereas to excel in wealth is the result not of merit but of luck, which can make even slaves and freedmen richer than us, the so-called well-born.

Therefore you will not be the richest man of all, but always poor because of your limitless desires. But if you would judge moderation by the *utility* of possession, you would already have numbered yourself among the rich, or at least certainly among the well-to-do; I certainly number myself among them, although I have less property than you.

If then you once persuade yourself of this, no loss will ever trouble you, and you will be happy, in so far as it is possible not to be troubled by [external] things.

And if you get rid of the similar insatiable desire you have for being admired, here is another respect in which you will be free from trouble. Not only are you not satisfied by being honoured by your acquaintances, but you want all the townspeople to praise you.

Recapitulation

If there be anyone still partly dominated by his passions who is able by himself to learn anything from the above

statements, then let him, as I have already said, set over himself a supervisor and tutor (*pedagogue*), who will as occasion arises remind him, scold him, stimulate and urge him on, and will himself cling always to the better path, and show himself as an example of what he says and preaches, and so make the soul free-spoken and fair. For it would be a base thing to make much of that freedom which is according to human laws, and to show no zeal for real and natural freedom, but to serve those base, wanton, and tyrannical mistresses, avarice, small-mindedness, love of praise, of dominion, and of notoriety.

Yet I would not hesitate to say that the mother of all these is inordinate desire (*pleonexia*).

NOTES ON HIS OWN BOOKS

[The following extracts are from two treatises, one entitled "On his own Books," and the other, a shorter one, "On the Order of his own Books." A considerable amount is of general autobiographical and even historical interest; much has reference to Galen's difficulties with jealous rivals.

The Pergamene was very careless about his own works. Students took away notes of his lectures and demonstrations, most of which were lost; some were pirated and were later passed off, either altered or unaltered, as the work of other men. Eventually he found many of the missing volumes, and the two present treatises were written in order to make good his claims to priority in certain cases.

The early work "On Proof" to which he refers has unfortunately been lost; no doubt it would show our author in his most logical, if not actually "geometric" vein.]

Greek text: Teubner's "Scripta Minora."

Your advice, my dearest Bassus, about the writing of my books has now been put into practice. In the Sandalarium, where are most of the bookshops in Rome, I was watching some people disputing whether a certain book which was being sold was by me or someone else; it was inscribed "Galen, the physician." And somebody was buying it as mine, when a savant, impressed by the peculiarity of the inscription, asked to know what the title was. He looked at

the first two lines and at once threw the book aside, merely exclaiming, " This is not Galen's style; the title of the book is wrong." The man who said this had had the preliminary education which from time immemorial used to be given to Greek children by grammarians and rhetoricians. And the majority of those who now engage in medicine or philosophy cannot even read properly; yet they frequent teachers of the greatest and noblest of human studies, namely, the lessons of philosophy and medicine. Now this careless way of doing things began many years ago, when I was still a youth, but at that time it had certainly not advanced to the stage it has now reached.

For this reason, then, and because many people have been mishandling my books, and people of various nations looking on them as their own, as also cutting out some parts, adding to others and altering others, I have thought it better to make clear, first, the reason for this mishandling, and secondly, in regard to what were actually my own writings, what title each bore.

Now you yourself, my dear Bassus, know the reason why so many people look on my books as theirs; they were given without inscriptions to friends or pupils who wished to have memoirs of what they had heard, on the understanding that they were not to be published, but were for themselves alone.

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" On the Sects, for Beginners," is the book which should be read first of all by those proceeding to study the art of medicine, since in it are described the sects, with their generic differences from each other (I say generic since there are also varieties amongst them about which students are later on instructed).

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Of some other works, however, which I then wrote for friends I retained copies for the purpose of a final elaboration. Among these are two books " On the Causes of Respiration " and four " On the Voice " addressed to one of the consulars, Boethus by name, who followed the Aristotelian school of philosophy. To this man were also addressed that " On Hippocratic Anatomy," and after it, that " On Erasistratean Anatomy." These were written in a somewhat emulous vein on account of Martialius, whose two anatomical books have been preserved and are still in the hands of many; at that time they enjoyed a high reputation. This man was rather spiteful and quarrelsome, although over seventy years of age.

So on hearing that my arguments and my public teaching in regard to an anatomical problem had been greatly praised by my whole audience, he asked one of my friends to what sect I belonged. And on being told that I called people "slaves" who proclaim themselves Hippocratics or Praxagorists, or, indeed, adherents of any one man, and that I selected what is good in each, he asked secondly whom of the ancients I praised most. . . . He maintains that Erasistratus is a marvel in these as in other departments of our art. It was therefore on account of this Martialius that I wrote in a spirit of some emulation the six books on the anatomy of Hippocrates and the three on that of Erasistratus. And once, when speaking in reference to the books of ancient physicians, I publicly brought forward that of Erasistratus "On Spitting of Blood." According to custom, I stuck into it a stylus, and pointing to that part of the book where he deprecates venesection, I spoke at considerable length against him, in order to annoy Martialius, who pretends to be an Erasistratean! And my address having won a good deal of approval, a friend of mine, who was angry with Martialius, asked me to dictate what I had said to an expert in quick writing by signs, whom he would send me; thus he would be able, when he left the city for home, to quote these passages against Martialius when visiting his patients.

Then somehow, when I went to Rome the second time at the command of the Emperors, the man who got this book had died, but quite a number of people had it; it had been composed in the then spirit of emulation, when I used to give public refutations. The fact is, I was still young when I did this—in my thirty-fourth year. From this time I determined to do no more public teaching or demonstrating, as I had had success greater than I could have hoped for in my practice. I knew how, when any doctor gets a reputation, his rivals envy him and call him a quack, and I would have liked to stitch up their spiteful tongues. In the presence of patients, however, I said nothing more than necessary. Nor did I teach or demonstrate to crowds as before; I merely showed by my practice how well acquainted I was with the science of medicine.

After I had stayed three more years in Rome, the great plague started, and I hurriedly left the city and hastened homeward. . . . So I returned from Rome to my own country on the completion of my thirty-seventh year. . . . After return-

ing from Rome I settled down in my own country, and continued my accustomed way of life. Then forthwith there came letters from the Emperors at Aquileia, summoning me, their intention being to leave their winter quarters and march against the Germans. I had perforce to set out, but I hoped to be excused, as I heard that one of the Emperors—the elder—was of a good disposition, moderate, gentle, and mild. He was at first called Verus, but when Antoninus [Pius], who ruled after Hadrian, appointed him his successor, he made the man who was formerly styled Lucius his colleague, calling him Verus and giving himself the cognomen Antoninus.

Now, when I arrived at Aquileia, the plague broke out in unprecedented fashion, so that the Emperors immediately retreated to Rome with a few soldiers, while the majority of us got through with difficulty after a long time, large numbers perishing by reason not only of the plague but of its being mid-winter when this happened. And Lucius having died on the road to Rome, Antoninus took his body and carried through his apotheosis, thereafter continuing the campaign against the Germans. He was extremely anxious to get me to go, but was persuaded to excuse me on being told that my family god Aesculapius commanded otherwise—he whose worshipper I declared myself to be since the time when he had saved me from a dangerous suppurative condition. The Emperor therefore worshipped the god, and bade me await his return (he hoped quickly to bring the war to a favourable conclusion). He himself went off, but left his son Commodus, a boy scarcely nine years old. He ordered his son's tutors to try and keep him in good health, and, if he ever should be ill, to call me in to treat him.

At this time I collected and put into durable shape what I had learned from my teachers and had myself discovered, and while continuing my researches, I set down a few things about these discoveries, keeping myself well exercised in various medical and philosophical problems. Most of these perished in the great fire in which the Temple of Peace, with much else, was burned.

Now, the campaign of Antoninus, contrary to all expectation, being protracted, this allowed me to devote the whole time to a very considerable discipline (*askēsis*), so that I completed my work " On the Utility of Parts " in seventeen books, and added those remaining to that " On the Principles of Hippocrates and Plato." . . .

Now, the volumes "On the Utility of Parts" had already got into many hands, and were being given serious consideration by almost all physicians who practised the ancient medicine, and, amongst the philosophers, by the followers of Aristotle, who had himself produced a somewhat similar work. Some malevolent individuals, however, spitefully filled the city with a wicked rumour that, in order to have the reputation of quite surpassing all predecessors, I used to set down as anatomical facts many things that were not entirely obvious; this, however, they said, would not deceive everybody. Now personally I ridiculed and despised them, but my friends were annoyed and asked me to demonstrate publicly in one of the big auditoriums the truth of the anatomical observations I had written of. And when I did not consent—for I had now come to think nothing of reputation—the slanderers imagined that through fear of being confuted, and not through scorn of their silliness, I was aping magnanimity. They did not stop jeering, but assembled every day in the Temple of Peace, which, before it was burned, was the usual meeting-place of all people who practised the logical arts. Under the compulsion, then, of my friends I publicly demonstrated during many days that I myself had not lied, and that earlier authorities had been ignorant on many points. Also at the request of my friends I wrote commentaries on the matters stated and demonstrated, these being therefore entitled "On Anatomical Facts unknown to Lycus."

As I proceeded with my demonstration that I had made no mistatement in my anatomical commentaries, I set in the middle all the anatomical books, giving everyone present an opportunity to propose any part he wished for dissection, and announcing that I would show that whatever disagreed with former authorities had been set down correctly by me.

The thorax having been proposed, I first began with the most ancient writers, and took into my hands their books; but some reputable physicians who were in the front seats asked me not to waste time, but since Lycus of Macedon, who had been a pupil of that most renowned anatomist Quintus, wrote down all discoveries up to his own time, they asked me to pass the others by and test his writings alone by my own. I agreed to their request, and did similarly with all proposals made each day.

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Having observed that all men in their disputations pro-

claimed that they were "giving proofs," and tried to confute their neighbours, there was nothing I was so eager to learn as the method of furnishing proofs. So, having been told that *the philosophers* taught this, I asked them . . . to quieten the pangs of my desire for proofs and to point out by what method one may learn, when someone else is giving a "demonstration," to discern clearly whether it is truly such, or whether, like a spurious coin, it resembles the genuine but is really bad; a method by which the learner also may reach a solution of the questions he himself investigates. So I approached all the best known Stoics and Peripatetics of the day, and, while I learned a great many rules of logic which later scrutiny showed me to be useless for proving things, I did also find a very few inquiries suitably carried out by their means, and directed towards the question at issue; yet even these few I found differing among themselves, some being even opposed to conceptions of the *physis*. In fact, by the gods! I should have myself fallen, like my teachers, into the deadlock [*aporia*, impasse] of the Pyrrhonists, had I not clung to the methods of geometry, arithmetic, and logic, which I had pursued from the beginning under the vigorous tutelage of my father—he having himself received this teaching successively from my grandfather and great-grandfather. Thus I saw that in regard not only to the prediction of eclipses and the preparation of dials and water-clocks, but also to everything that is reckoned as concerned with architecture or engineering, the phenomena were perfectly evident. I therefore thought it better to employ proofs of a geometrical type. I found, in fact, that the greatest dialecticians and philosophers differed not only from each other but also among themselves, while they all equally commended geometric demonstrations. For this reason also all the more I realised that one must withdraw from their dogmas, and must follow demonstrations of a geometrical character.

I advise, therefore, all who wish exercise in geometrical methods of demonstration to get lessons in these, and afterwards to read my work "On Proofs," written in fifteen books. I also wrote many other treatises to exercise myself, of which some were lost in the fire when the Temple of Peace was burned, and others, given to friends, have been preserved and are now, like the rest of my work, in many people's hands.

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Now, one person will admire one physician or philosopher, and one another, without either having studied their work or practised the logical method so as to be able to separate what are false in their arguments from what are true. The reasons for their admiration are either that their fathers, teachers, or friends were Empirics, Dogmatists, or Methodists, or that So-and-So, belonging to this or that school, was famous in their native town. And similarly with the philosophical schools: one for one reason and one for another becomes a Platonist, Peripatetic, Stoic, or Epicurean. . . . I was for these reasons forced to write a book "On the best Sect," this being not such as many physicians and philosophers have previously written, praising their own sect by name; it only pointed out the way which one should follow in order to establish the best sect, whether in medicine or any other art. In this book also was mentioned and explained what I have just spoken of—viz. that whoever wishes to be a proper judge of the sects must first have made himself acquainted with *logical proof*. Yet even this is not enough; one must also have become *free from passion;* for it is by reason of this that the bulk of mankind love or hate the sects, and so are blind concerning them. If anyone, then, being free from passion, will either seek the truth for himself by the logical method, or will judge other people's statements, this is the only person who can discover the best sect. You also yourself know that most physicians and philosophers, when convicted of never having practised any logical method, take the opposite tack; some of them saying that there is no such thing as proof, others not only that it exists, but that it is known to us all naturally and spontaneously, so that nobody needs either to learn or practise it. How is one to continue arguing with people who go to such extremes of absurdity?

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I was brought up by a father who, versed in the arithmetical, logical, and grammatical sciences, taught me these, as well as the other subjects of education. Then, when I was in my fifteenth year, he began to interest me in dialectic theory, his idea being that I should give attention to philosophy alone; then, however, when I was in my seventeenth year, he was impelled by vivid dreams to make me engage in medicine as well as philosophy.

But even although I had such a good fortune as this, and mastered everything I was taught quicker than everybody

else, yet if I had not devoted the whole of my life to cultivating both the medical and philosophical points of view (*theoremata*), I would have known nothing much.

It is, for this reason also, no wonder that a great many people who practise both medicine and philosophy make a success of neither. Either they have not a good heredity, or they have not been educated properly, or they have not continued disciplining themselves, but have turned aside to political activities.

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I am not in agreement with what some people are nowadays demanding, that everybody should talk Attic, even if they happen to be physicians, philosophers, geometers, musicians, or lawyers; or even without that, if they are simply rich or only well-to-do. On the contrary, I strongly object to anyone being blamed or reproved for committing solecisms of speech; better this than to commit solecisms and barbarities in the conduct of life. I even once wrote a treatise against those who object to linguistic solecisms, so far am I from considering the speaking of Attic to be any real part of education.

ON HABITS

[Galen here quotes several authors, and especially those " ancients " Hippocrates and Erasistratus, to show the importance of habit, and how it must often be given precedence over other considerations.

As regards the question of habituation to food, Galen gives an explanation, or at least a *rationale*: the organism alters, and, in fact, assimilates its material. At the same time the material (or the " environment ") to some extent also assimilates the organism; witness the effects of soil on seed. Similarly, other environmental factors affect the constitution, and we thus become adapted or " acclimatised " to new conditions or to new kinds of work.

It is noteworthy that Galen here couples Erasistratus' name with that of Hippocrates, calling them " the most illustrious of physicians." For although in many ways opposed to the great Alexandrian's almost " Methodist " tendencies (*v.* General Introduction, p. 14), Galen could obviously not afford to overlook him. At the same time it will be noticed that he

rejects Erasistratus' claim to certain kinds of repeated evacuations being " habits " at all.

In the present treatise our author emphasises factors which in modern biology are sometimes called Lamarckian; he lays stress on the effects of use and disuse. His remarks on the reciprocal effects of soil and seed have a very modern ring. The final sentence of that section (p. 188) shows how upon the original " nature " of an organism habit may implant a " second nature." Galen would not appear quite to realise the possibility of the " natural " properties of the organism having themselves originally arisen in the same way, and having then been transmitted by heredity. For another example of custom becoming natural habit we may compare Hippocrates' description of how the Macrocephali got their long heads (" Airs, Waters, and Places," p. 63).]

Greek text: Teubner's " Scripta Minora."

[Importance of habit. Hippocrates and Erasistratus quoted.]

Among indications for treatment recognised not merely by the best physicians but by mankind in general is that drawn from a study of habits. Now, an attempt to belittle this factor is made by certain people of the class of those who love to disparage everything that involves clear thinking. They ask us how it can be, for example, that a person after eating beef for the first time may be the worse of it, and yet, being thereafter forced to eat it daily for a year, may either suffer no further, or at least less than people who are unused to it. They then bring an argument against anything we can say, and imagine that thereby they have destroyed the fact itself; this is as if someone, after opposing all the theories which explain vision, were to maintain that people cannot see.

It is, then, perfectly clear that the consideration of habits furnishes a very great contribution towards the discovery of cures, and this is why Hippocrates writes in the " Aphorisms," " Even old and weak people, if they be accustomed to endure certain tasks, will do these more easily than strong young people who are unused to them." And further, in " Regimen in Acute Disease," he describes the harm done by an unwonted regimen, and the benefits of one to which a person is accustomed. In the same way, Erasistratus, in the second book of his work on " Paralysis," obviously takes the same view as Hippocrates about the various kinds of habit.

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Of course, also, as regards the administration of cold water, which we often give in cases of acute disease, some people oppose us, bidding us not to administer this in fevers, but to content ourselves with the indications drawn from other points of view, as, for example, from the parts affected, the state (*diathesis*) in which these parts are, the patient's age, the locality, the time of year, as also the patient's temperament (*crasis*), and strength. . . . They maintain that it would be absurd if, when a person accustomed to drinking cold water had inflammation of the liver, lung, stomach, or some similarly important part, we were to order him to take a cold drink simply because this was his habit; this, they say, would be like allowing people used to taking cold baths to do so in fever. They speak as though we ordered people suffering from any kind of illness to do everything they are accustomed to, and did not merely add the consideration of habits to all these other considerations! . . . Hence, since the remedy has had prolonged trial, we must proceed to search for the cause, and first we will remind ourselves of what Hippocrates wrote in " Regimen in Acute Disorders," and Erasistratus in the second book of his " Paralysis." The statement of Hippocrates is as follows [Chap. XXVIII]:—" But indeed it is easily understood that an unvarying diet of poor food or drink is on the whole less dangerous to health than if one suddenly makes a big change to a better diet. For, both in those who take two meals a day and those who take one, *sudden changes* do harm and produce weakness. When those who have not been accustomed to a midday meal take one, they immediately become feeble, and their whole body becomes heavy, weak, and sluggish; then, if they take supper in addition, they have acid eructations. In some even diarrhœa occurs if, contrary to custom, their alimentary canal is loaded when it had been used to remain dry, and not to be twice distended and have to digest [concoct] its food twice." Then, after parenthetically stating how the damage is to be repaired, Hippocrates reverts to the subject of those who have transgressed habit, and writes as follows:—" Such an individual would suffer still more if he ate three times daily to satiety, and even more if more often. Yet there are many who can easily take three meals a day if they are so accustomed. On the other hand, if those individuals who have habituated themselves to eat twice a day should miss their midday meal, they become weak, languid, disinclined for all work, and prone to heartburn; their viscera seem to hang, they pass hot and high-coloured urine, their

fæces are parched. In some cases also there is a bitter taste in the mouth, the eyes are sunken, the temples throb, and the extremities become very cold. Further, most of those who miss their midday meal are not able to take their supper properly; after taking it, they suffer from weight in the abdomen and they sleep much worse than if they had previously taken their midday meal."

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Thereafter, again, Hippocrates, having as before described certain methods of correcting the harm so done by unaccustomed fasting, proceeds as follows [Chaps. XXXVI–XXXVII]:—"One might refer to many other allied conditions of the digestive organs; one might tell how accustomed fare is readily borne, even if it be not naturally good, and so also with drinks; whereas unaccustomed food is not well borne even if it be not bad; and so again with drinks.

"Further, if it were a question of eating a great deal of meat contrary to custom, or of garlic, silphium, juice or stalk, or any similar substances possessing *powerful properties*, one would be less surprised at such things causing more pain than others in the bowels. But it is more astonishing to realise what disturbance, swelling, griping, and flatulence mere barley-cake (*maza*) produces in the bowels when eaten contrary to custom by anyone who ordinarily eats bread; or, again, what weight and distension is caused by bread in the bowels of one who is used to eat *maza*; what thirst and sudden fullness are brought about by bread itself eaten hot, owing to its dry and heavy qualities; what different effects are produced by highly refined or coarse bread when taken contrary to custom; and by barley-cake when unusually dry, moist, or viscid; what by new barley-bread in those not used to it, and by old on those who are used to new. Further, a sudden change from habitual drinking of wine to that of water or contrariwise, and of diluted wine or unmixed wine suddenly taken contrary to habit; the former causes splashing in the upper, and wind in the lower part of the alimentary tract, while undiluted wine produces throbbing in the veins, fullness in the head, and thirst. Again, when white and dark wine are exchanged one for the other in defiance of custom, even if both be vinous, yet this causes a great deal of alteration in the body. Hence it will be less surprising to learn that sweet and vinous vines cannot be suddenly interchanged without the same thing occurring."

So far then the examples from the writings of Hippocrates regarding the importance of custom. Next Erasistratus, in the second book of his treatise "On Paralysis," writes as follows:—"Whoever is to exercise medicine properly must pay a great deal of attention to what is habitual and what not. The following are examples of what I mean. People carry out numerous familiar tasks without fatigue, whereas a few unwonted tasks tire them. Some persons digest familiar food more easily—although it be naturally difficult of digestion—than easily digested food to which they are not accustomed. Again, the body calls for its customary evacuations, even although these be useless, if they have developed into a habit; and when deprived of them it falls into disease. This is the case, for instance, with the hæmorrhoidal flux and the evacuations which some people habitually administer to themselves; and even where sores open from time to time with ichorous discharge, and sometimes in the purgings (*choleras*) which take place at certain epochs. For the body demands all these various discharges, although they are useless, and when they do not occur at the ordinary times, people who are used to having them fall seriously ill. The following sort of thing may also be observed. Suppose we are asked to quote two or three lines out of the middle of an epic or iambic poem which we know; being unused to this, we do not readily manage it, but when we come to these same lines in their natural order, we say them easily; further, with practice, we can do even the previous task as well.

"The following also may occur. People who are unused to learning, learn little, and that slowly, while those more accustomed do much more and do it more easily. The same thing also happens in connection with research. Those who are altogether unfamiliar with this become blinded and bewildered as soon as their minds begin to work: they readily withdraw from the inquiry, in a state of mental fatigue and exhaustion, much like people who attempt to race without having been trained. He, on the other hand, who is accustomed to research, seeks and penetrates everywhere mentally, passing constantly from one topic to another; nor does he ever give up his investigation; he pursues it not merely for a matter of days, but throughout his whole life. Also by transferring his mind to other ideas which are yet not foreign to the question at issue, he persists till he reaches the solution."

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Such then are the statements made by these most illustrious of physicians, Erasistratus and Hippocrates, regarding the power of habit; nor do they base their conclusions on reasoning [*logos*], but have learned from obvious facts. This, of course, is the practice of all people who do not live like swine or asses, but pay attention to what helps or harms them. One may daily hear these people saying that they have " become used to " such and such food or drink, and that therefore they cannot give it up, since changes undoubtedly do them harm. And similarly also they speak about their activities, such as bathing, or abstention from bathing, horseback exercise, hunting, racing, wrestling, sleep or deprivation of sleep, exposure to sun and to cold, intellectual activities, and everything of the kind.

[Reason for importance of habit. Coction or digestion assimilates food to organism, producing affinity or congruity. Inborn affinity and that acquired by habit. Soil and seed.]

We too, then, may disregard those who hold the consideration of habits to be of little or no account in treatment. Next we have to consider from what cause habit is so powerful, and whether there is but one cause, or whether this differs according to the material involved. By *material* I mean that in which the habit occurs: for example, as already said, food, drink, gymnastic exercises, baths, and the like. I shall, in fact, make a beginning with articles of food and drink. Why, then, is it that of those who habitually eat beef, some do not suffer in any way and others less than before they acquired the habit? And why is it that some people naturally, from the beginning of their lives (as Erasistratus himself writes), digest beef more easily than rock fish? . . .

Let us begin our argument by first dealing with the concept of cooking or *coction* (*pepsis*). Just as bakers say that they *cook* bread, not when they are reducing the corn into small particles by pounding and sifting it, but only when, following this operation, they soak it in water, mix it with leaven, knead it, and then enclose it in a heating receptacle, where they leave it till, as they say themselves, it *ferments*, after which they bake it in baking-pans or ovens; so also with substances ingested into the stomach; we do not say that these undergo *cooking* or *coction* when they are being bruised and broken up, but when, as in the process of cooking corn, they undergo a

change of quality. And just as, in the case of bread, the corn which undergoes coction must be brought to the quality congruent with us who eat it, so in the alimentary canal it must be brought to a quality still more congruent.

Now I call one quality more congruent or akin than another in reference to its similarity with the body which is to derive nourishment from it; for one article of food is akin to one body and one to another. It is for this reason that animals approach their appropriate food instinctively [lit. "without being taught"], under the impulsion of [their] nature, beasts of burden seeking for plants, for straw, grass, and barley, while lions, as also leopards and wolves, seek for flesh.

Just, then, as among the various classes of animals the difference is no small one between the foods akin to each, similarly also great differences are found among the species in each class. Thus some people are not even able to taste wine, while others drink large quantities with impunity. Some, as has been said, eat the flesh of oxen, goats, or sheep with pleasure, and digest it without discomfort; others cannot even bear to smell it, far less eat it. And when in the absence of any other food, as happens in time of famine, they force themselves to eat flesh, they cannot digest it without harm; their appetite disappears as soon as they take such food, they at once feel heavy, and if eructations supervene, these too cannot be borne without discomfort.

Now these being matters of observation, we must in the first place keep in mind that men find one food more pleasant than another by reason of its natural kinship or affinity with them, that they more readily eat such foods, as well as those which appear to them to be easily digestible, and that they discard and avoid unpleasant and indigestible substances. Thus habit is a *sign* of natural affinity.

And that it also often becomes a *cause* [of such affinity] is clear from the fact that substances which are at first found by certain people unpleasant or noxious, no longer continue so if one waits till a habit gradually establishes itself. Now, the cause of this is as follows: just as every article of food and drink becomes altered in quality, so also is the altering factor itself affected. A clear proof of this may be found in the different *humours* produced by each article of food; some produce a melancholic (atrabiliary) blood, others a phlegmatic blood or blood containing a fair amount of the pale, so-called yellow, bile; some again produce pure blood. So also there is neces-

sarily a difference brought about in the parts nourished, according to the kind of blood which nourishes them.

A clear proof of the assimilation of things which are being nourished to that which is nourishing them is the change which occurs in plants and seeds; this often goes so far that what is highly noxious in one soil becomes, when transplanted into another soil, not merely harmless but actually useful. Those who compose treatises on agriculture or on plants have had great experience of this, as also writers on natural history; these authorities tell us of the changes produced by locality.

Now, since not only is the nourishing agent altered by what it nourishes, but the latter itself also undergoes some slight alteration, this slight alteration will necessarily become considerable in the course of time, and thus the affinity produced by long-continued habit comes to resemble natural affinity.

[Similar effect of other environmental factors.]

I think, then, we have found the reason for the power of habit as regards food and drink; let us next consider the same principle in respect to external influences. These also would seem, generally speaking, to have the same cause as those already discussed. They produce a certain alteration (*allœosis*) in the body.

. . . . . .

Now a source of heat, such as the sun, when it is in contact with a body for a long time, produces in it a condition opposite to that which it first produced. For the sun at first by warming us disperses the fluids of our body, relaxes our skin, and makes our flesh soft; but if one remain exposed to it for several days in summer, without his clothes, his skin becomes hard and parched and his flesh dry. In such cases, however, this is not the result of the long-continued *heat* alone, but of the *dry* principle which is combined with it. This very often leads us astray in our speculations regarding causation, when we overlook the associated cause; we ought to realise that moist heat has one effect and dry heat another. . . . Thus as humidity alone, without appreciable heat, moistens the body, while heat heats, similarly a combination of the two will be seen to produce both results. The latter happens in the case of warm fresh-water baths; on the other hand, in sun-baths the drying principle is combined with the heating; the summer sun tends to so act that in those people who spend most of their time exposed to it and without their clothes—

for example, harvesters and sailors—the skin becomes hard and dry as in scaly animals.

Now just as the *natural* peculiarities of bodies and of the whole constitution, and the varieties of skin in respect to hardness and softness, closeness and looseness of texture, demand different kinds of food and drink, and all behave differently under the influence of heat and cold: in the same way peculiarities which arise from *habit* derive, like natural ones, benefit or harm from the alteration produced by food and drink, and by cooling and heating agents.

. . . . . .

[Effects of exercise, physical and mental. Plato quoted.]

Such then is the state of affairs as regards the aforesaid classes of case. As regards physical exercises it is as follows. Those parts of the body which are exercised become stronger and more callous, and hence are better able to undergo their proper movements than other parts which, through lack of exercise, are softer and weaker. And the same general principle holds also in respect to mental training. We are first, while yet children, trained by grammarians, and subsequently by teachers of elocution, of geometry and of arithmetic, theoretical and practical. For since there exist, in the leading part of the mind, faculties for all the arts, there must necessarily be one by which we appreciate logical agreement and contradiction, and another by which we remember, and it is in relation to the former faculty that we grow more intelligent, and to the latter that our memories improve; for all the faculties are naturally increased and strengthened by exercise, and impaired by disuse. Such indeed is what Plato also teaches in the "Timæus," the following being his statement: "I have often said that there are three kinds of soul resident in us, each of which has functions (movements); similarly also now it must be very briefly said that whichever of these remains inactive and does not exercise its proper functions must of necessity become very weak, whereas that which is exercised grows very strong. Care must therefore be taken that they keep their respective functions in good proportion to each other."

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[Erasistratus' "habitual evacuations" not true habits.]

These then are the different kinds of habit, according to the different matters in which they occur, and the potency of the

causes from which they arise. Now Erasistratus states that the body also "demands" evacuations [see p. 185] when certain individuals have accustomed themselves to these; so this point also must be considered.

Thus we know that some people bleed at the nose, regularly or at irregular intervals, or that they have evacuations by means of hæmorrhoids or vomiting, or become the subjects of diarrhœa or cholera. Sometimes also they intentionally bleed themselves, either by phlebotomy or by scarification at the ankles, or deplete themselves by evacuating medicines, either emetics or purgatives.

These also it would seem useful to consider. Personally, I do not think that it is owing to *habit* that bodies desire such evacuations. I think that it is from the same cause for which the first evacuation was required—whether this was effected by *nature* or by some individual in conformity with medical reasoning—that similarly again and yet again the same measures are needed in the same cases. Thus some people having through bad regimen, and others through an unhealthy bodily constitution, developed a plethora of blood or a morbid state of the humours (*cacochymy*) are relieved by the evacuations mentioned, whether it be nature or a physician that thus removes the excess before the patient can fall ill. In some actual diseases too the *crisis*, occurring with such discharges, brings about a cure of the disease. Some people, again, have been cured by doctors who used similar methods; then later, being taken ill with a similar disease and once more cured by them, if ever again they have a feeling of weight all over the body, or in the head alone, or if some irregularity or indeed anything abnormal show itself, they consult the doctors, and tell them that they are afraid they may take the same diseases from which they formerly suffered after having had the same symptoms. Then, having managed, by means either of some evacuation or blood-letting, to escape the expected disease, they more readily have recourse to the same remedy when they feel themselves affected by any similar symptom. Others again, even without feeling anything, regard with suspicion the return of the period at which they regularly feel some of these symptoms, and hence anticipate it by an evacuation. Of this prophylactic evacuation they say that it has become "habitual" with them, although the body undergoes no change from these evacuations, such as it was shown to do in the previous instances; it merely is affected in the same way by

the same cause. If, then, they alter their regimen, eat less, and take more gymnastic exercise, they remain free from disease, and are helped by the change of habit, not injured like the previously mentioned individuals. For it was not by reason of habit that they chanced to be benefited by the evacuations, but because through bad regimen they had become engorged with morbid humours and a plethora of blood.

GALEN'S SEARCH FOR THE LEMNIAN EARTH OR "SEALS."

("On Simple Drugs," Book IX, Chap. II.)

Greek text: Kühn Vol. 12.

[Our author describes two journeys which he made to the island of Lemnos, in order to obtain some of its famous medicinal earth. This was sold in stamped cakes, and was known in Latin times as *terra sigillata*; even to the present day it continues to be exported, and is locally called "holy earth."

Lemnos was sacred to Hephæstus, or Vulcan, reputed to have been hurled down from heaven on to the island by his father Zeus. In connection with this story it was believed all through classical times that an active volcano existed on the island. Whether the story is true or not, at least no traces of a volcano now remain, nor obviously were there any in Galen's time. In this connection his explanation of the Hephæstus legend is noteworthy.

Galen's first visit to Lemnos was paid when he was making his way to Rome *via* Aquileia (*v.* p. 177). Myrina, the port at which he landed, was on the site of the present Kastro, on the west side of the island, whereas Hephæstias and the sacred hill lay on the north-eastern coast. A glance at a map of the Ægean will at once show why the physician's first visit was unsuccessful, and why on the second occasion he approached Lemnos more appropriately from the north.

Galen's description of the priestess's procedure in collecting the material for her "seals" will interest folklorists, while the various uses to which this mud or "fango" are described as having been put, particularly the external ones, have numerous analogies at the present day.]

"Earth," as I have said, is the name commonly given by all Greeks to that soil which, when put into water, becomes at once liquefied and turns into mud. That used in agriculture has certain varieties, a fat and sticky kind being quite dark in colour, while another kind, not fatty, but more friable, is called white clay [potter's earth], this having a whitish tint. These are the extreme varieties, and the other earths are between them, approaching either the one or the other. . . . Some varieties of earth are formed by a mixture of heterogeneous substances of a stony and sandy nature; this combination becomes broken up by moistening and stirring with plenty of water until the whole is thoroughly soaked; then, when this is allowed to stand, all the contained stony and sandy matter settles, while the genuine earth remains on the surface.

Much the same thing happens in the case of the Lemnian earth, which some call Lemnian *miltos* [red-earth, Lat. *rubrica*], and others Lemnian Seal, owing to the holy seal of Artemis being stamped upon it. The priestess collects this, to the accompaniment of some local ceremony, no animals being sacrificed, but wheat and barley being given back to the land in exchange. She then takes it to the city, mixes it with water so as to make moist mud, shakes this violently and then allows it to stand. Thereafter she removes first the superficial water, and next the fatty part of the earth below this, leaving only the stony and sandy part at the bottom, which is useless. She now dries the fatty mud until it reaches the consistency of soft wax; of this she takes small portions and imprints upon them the seal of Artemis; then again she dries these in the shade till they are absolutely free from moisture.

This then becomes what all physicians know as the Lemnian Seal, being so named, as I say, by some on account of having the seal stamped on it, just as by others it is called Lemnian red-earth (*miltos*) from its colour; for its colour is the same as that of red-earth, although it differs from this in not leaving a stain when handled. It is also like the hills of Lemnos, which are entirely tawny (*cirrhous*) in colour, and on which there is neither tree nor rock nor plant, but only this kind of earth.

Three varieties of it are found. One is the above-mentioned sacred earth, which nobody touches but the priestess. A second kind is the real red-earth (*miltos*), mainly used by builders. The third is that which removes dirt, and which can be used, if desired, by those who wash linen and clothes.

Now, I had once read in the works of Dioscorides and others

that the Lemnian earth is mixed with goats' blood, and that it is out of the mud resulting from this mixture that the so-called Lemnian seals are moulded and stamped. Hence I conceived a great desire to see for myself the process of mixture. So, as I had travelled to Cyprus in order to visit the mines there, and also to Cœlo-Syria, a part of Palestine, to find bitumen and some other things worthy of observation, similarly I was in no way averse to sailing also to Lemnos in order to see in what proportion blood was mixed with the earth.

So on coming the second time from Asia to Rome by the land route through Thrace and Macedonia, I first sailed from Alexandria in the Troad to Lemnos, having happened to meet with a ship bound for Thessalonica, whose captain agreed to put in first at Lemnos. And he did actually touch there, but not at the proper town. For at first I did not know that there were two towns on the island, but imagined that, as in the case of Samos, Chios, Cos, Andros, Tenos, and all the other Ægean islands, so also Lemnos would have one single town with the same name as the whole island. But when I landed on the island, I found that the town was called Myrina, and that neither the temple of Philoctetes nor the sacred hill of Hephæstus were in the territory of this town, but in the other town, called Hephæstias, which was not near Myrina. Further, the captain was unable to wait; so I deferred my visit to Hephæstias until I should be coming back from Rome to Asia. And this I actually carried out as I had hoped and resolved. For when I was passing over from Italy into Macedonia, and had traversed nearly the whole of that province, I arrived at Philippi, which is a town on the frontiers of Thrace. From here I went down to the neighbouring coast, one hundred and twenty stades away, and sailed first to Thasus, some two hundred stades distant, thence to Lemnos, seven hundred stades; then again from Lemnos to Alexandria in the Troad, another seven hundred stades. (I have purposely written about my voyage, and the number of stades, in order that if anyone wishes like me to visit Hephæstias, he may know its situation, and arrange his voyage similarly.)

Now, taking the island of Lemnos as a whole, Hephæstias lies to the east, and Myrina to the west. As to what the poet said about Hephæstus, that he fell in Lemnos, it seems to me that the fable refers to the nature of the hill, which has every appearance of having been burned, both from its colour, and from the fact that nothing grows on it.

This, then, was the hill to which, at the time I disembarked, the priestess came. She threw a certain quantity of wheat and barley on to the ground, and did some other things in accordance with local ritual, then filled a whole waggon with earth. This she took into the town, as I have just said, and from it prepared the far-famed Lemnian seals.

I thought well then to inquire whether there was no tradition of goats' blood being mixed with the earth. All who heard this question of mine laughed, and they were not mere chance individuals, but people well informed about the whole history of the locality, as well as in other matters. In fact, I got a book from one of them, written by a former native, in which all the uses of the Lemnian earth were set forth. Therefore I had no hesitation myself in testing the medicine, and I took away twenty thousand seals.

The man who gave me the book, and who was counted among the leading citizens of Hephæstias, used the medicine himself for many purposes: thus for old-standing wounds that were slow to heal, for viper bites and animal bites in general; he also used the seal for poisons, both in prevention and cure. He said that he had also tried a juniper preparation to which some Lemnian earth is added; this causes vomiting if drunk while the poison is still in the stomach. As a matter of fact, I have also myself had experience of this in cases of poisoning by sea-hare[1] and cantharides; when patients suspected they had taken something of the kind and were immediately made to vomit by the Lemnian seal preparation, they thereafter felt none of the symptoms that follow ingestion of hare or cantharis, although the taking of these poisons had been proved. I am not, however, certain whether the mixture of juniper and Lemnian seal has also the same potency against the other poisons which are called *deleteria*.

In any case the citizen of Hephæstias went so far as to declare that it would even cure the bite of a mad dog, if taken mixed with wine, or applied to the wound with very sour vinegar. In fact he said that, mixed with vinegar, it was also a cure for the bites of other animals, if over it were applied the leaves of such plants as, we are taught, resist putrefaction. He especially advocated water-germander (*scordium*), then slender centaury, and next horehound (*prasium*). Indeed, whenever I

[1] Sea-hare (Aplysia), a mollusc which secretes a purplish fluid when handled; it was the object of many superstitions in antiquity.

have used Lemnian earth in malignant and putrid ulcers it has proved of great value; its use is here determined by the size of the ulcerating surface. If this be fetid, and very boggy and foul, it is checked by a Lemnian seal dissolved in very sour vinegar, and brought to the consistence of mud, like these pastilles (*trochisci*) which are made in various ways. I mean those of Polyeides, Pasio, and Andro, and that just mentioned which is called Betinian. All these have a powerfully desiccative action and so help malignant ulcers; they are dissolved either in sweet wine, boiled wine, mead, or one of the white, tawny, or yellow wines, as required (these will be distinguished in another book). Similarly they are sometimes dissolved in vinegar, or in wine, water, vinegar-and-honey (oxymel), sour wine and water, and honey-mixture. The Lemnian earth dissolved in any of the above makes a suitable application to promote the closure of recent wounds, and to cure those which are chronic, slow to cicatrise, or malignant.

And similarly with every other medicinal earth. For just as I have already distinguished from the elemental earth, which contained stones, that which was dissolved into mud, so now it will be necessary to distinguish medicinal earth from that used in agriculture. There could be no greater mistake than to give this latter name to that which we use in medicine, although the fatty part even of agricultural soil is useful in the treatment of all parts needing desiccative treatment; hence many people in Alexandria and Egypt employ it of their own accord, and many also in consequence of dreams. Thus I have seen some people in Alexandria who suffered from dropsy and splenic trouble use the mud of Egyptian earth. Many also who have used the mud of this earth for their legs, thighs, upper and lower arms, backs, ribs, and breasts, got obvious relief. Similarly, this mud helps chronic inflammations and flabby swellings; thus I have seen some people who had become swollen all over through immoderately bleeding piles derive marked benefit from this. Others who had chronic, persistent pains in some part have been perfectly cured. For every earth has a drying action, its body being naturally dry, and when it is entirely free from fiery essence it dries without burning; this action is also promoted by a preliminary washing [of the earth].

ON ANTIDOTES

[Galen here speaks of the antidotes called mithridatium and theriac. The first was invented by Mithridates Eupator, king of Pontus (163–120 B.C.), " after Hannibal, the worst enemy that Rome ever faced," and theriac was an improvement on this, made by Nero's court physician Andromachus. The Attalus referred to by Galen was king of Pergamum (138–133 B.C.); he conducted similar experiments to the other two. In those imperialistic days, poison was much used in political warfare; hence the desire of rulers to discover universal antidotes.

It is of interest to observe Galen's statement that the Emperor Marcus Aurelius was in the habit of taking a theriac which contained opium (the Greek word *opion*, Latinised into *opium*, is a modified form of *opos*, meaning vegetable juice).

In the second chapter Galen throws some valuable light on the sources from which the materia medica of his time was derived.]

Greek text: Kühn, Vol. 14.

Book I

Chapter I

[What an antidote is, and how theriac originated.]

Physicians give the name of antidotes to those remedies which are not applied externally but are taken internally. They are all divided into three groups. Some are given for poisons, some for the bites of so-called venomous animals, while others are helpful in affections arising from faulty diet. Some, again, profess to fulfil all three functions. Of such is the so-called *theriac*, which was composed by the physician Andromachus, and which took the place of *mithridatium*, itself also named after its inventor. This Mithridates, just like Attalus with us, in his eagerness to gain an acquaintance with almost all the simple herbs which antagonise poisonous substances, tested their powers on criminals who had been condemned to death. Some of them he found especially useful for the bites of venomous spiders (*phalangia*),[1] others of scorpions, others of vipers: then as regards poisonous drugs, some of his simples he found useful against aconite, others against sea-

[1] *Phalangia* were venomous spiders, apparently of the genus *Lathrodectes*. Cf. Xen. *Memorab.* I, 3; Aristot. *Hist. Animal.* IX, 39. Cf. also p. 222 *infra*.

hare,[1] and so forth. So Mithridates mixed these all together and made a single drug, hoping he would now have a resource against all poisons. Later, Nero's head-physician (*archiatrus*), Andromachus, by the addition of some substances and abstraction of others, made the so-called *theriac antidote*, mixing with the other ingredients a considerable amount of viper's flesh which was not in the mithridatium. Hence theriac is better for viper bites than is mithridatium, although the latter is no less good for other poisons; for some indeed it is better.

These medicines have different potentialities when taken before and after the deadly drugs. The quantity which, when taken before, is enough to prevent any trouble must, if given after, in order to be of use, be four or five times as much in quantity, and be taken not once but twice a day. And if one takes the drug daily, as did our late Emperor [Marcus] Aurelius Antoninus, or Mithridates himself, he will be quite secure against deadly poisons and the drugs called *deleteria*. Thus it is said that when Mithridates preferred to die by poison rather than become subject to the Romans, he could not find anything capable of killing him.

This is what I have heard about Mithridates. About Antoninus I know personally that for his own safety he used to prepare and take each day as much as an Egyptian *cyamus* [a small measure], swallowing this either with or without admixture of water or wine or the like. And when he began to get very drowsy at his daily occupations, he took away the poppy-juice [from the mixture]. Then, owing to his former custom—for he was naturally of a somewhat dry constitution (*crasis*), and this was a drying drug which had been given him for a long time—he began again to pass the greater part of the night without sleep. Hence he was forced once more to take some of the mixture which contained poppy-juice, as this had now become more or less habitual with him. (I have often said already that such drugs had a milder action on him when they were taken for a length of time).

The Emperor was then, on account of the German war, in the Danube region, and I had been excused from serving in the campaign. He used to speak highly of the antidote of Demetrius, his principal physician (*archiatrus*), and, after the latter's death, he wrote to Euphrates, his general agent (*catholicus*), from whom he used to get the simples for compounding, asking him to say who was with him of those who

[1] For Sea-hare, cf. p. 194, footnote.

drew an Imperial salary. On learning that I had always been with him when the compositions were made, he gave orders that the antidote should be prepared by me. This was the only one that pleased him; so on coming to Rome he inquired in what proportion I used the simple drugs in my preparation. I told him the whole truth, namely, that I neither left out nor added the smallest detail to the ingredients sanctioned by ancient custom of the court physicians. I also pointed out the reason why I was myself especially pleased with the preparation. It is because I intend to speak about it now also that I have mentioned what happened then. For as Antoninus took the medicine every day with plenty of honey, he gained a very accurate knowledge both of its qualities and its defects.

Chapter II

[How theriac is best prepared.]

This, as well as nearly all other drugs, is best made when the ingredients are good, and correspond with each other in strength. The majority of people cannot even, to begin with, estimate the qualities and defects of any of these ingredients singly; hence also they are ignorant how far they correspond in strength to each other. For the same reason they sometimes employ a great quantity of drugs which are weak, either from nature or from lapse of time, and mix with them others which are very powerful. One individual will take a very strong juice which comes from Thebes in Egypt, and make an antidote resembling the Philonian drug both in taste and strength. Again, mixing myrrh, a very strong substance, with others of which most are weak, he will cause the antidote to be overpowered by it. Another person similarly makes the same mistake with saffron (*crocus*), another with sagapenum, as again another with bitumen and galbanum. Others use even two or three of these strong substances with others which are weak, and they thus cause the antidote to be overpowered by the former.

Any quick-witted individual will easily learn the method of preparation if he does it a single time; but in order to know the ingredients thoroughly, he must have examined them not merely once or twice, but very many times, even if he has somebody to show him, and reason teaches him what is the best. And where an individual attempts to learn the drugs

without having a guide, and merely by reading some book, such as the "Theriaca" of Heraclides of Tarentum, of Crateuas, Dioscorides, Niger, Iollas, Rufus of Ephesus, and some others, he will need much more personal observation (*autopsia*) in order to get an exact idea of the qualities and defects of each drug. For the small traders adulterate some of them so skilfully that even people very familiar with them are deceived. Hence it is far best to have the drug brought from a distance by some trustworthy friend in the country where it is best produced, or to go there one's self once and for all, and to procure those drugs which can last the whole of one's life, as, for example, nearly all the so-called minerals [*metallica*].

Personally, I wished to investigate Cyprus for this purpose, so, having a friend who had much power there, an associate of the governor of the mines, Cæsar's procurator, I got a great deal of cadmia [calamine] from there, as also diphryges [copper], spodium [copper oxide], slag, rock-alum, vitriolic earth, sory, and flowers of copper. From Syria in Palestine also I obtained gum-balsam (*opobalsamum*) in perfect condition. For bitumen cannot be fraudulently adulterated, nor can the fruit of gum-balsam nor the tree-balsam.

I also sailed to Lemnos, and for no other reason (as the gods know) than to get the Lemnian earth or "seal," whichever it is called. This has been thoroughly described in the ninth book of my treatise "On the Properties of the Simple Drugs" [p. 191]. This then—whether we call it Lemnian earth or Lemnian seal—they counterfeit, so that nobody is able to distinguish the true from the false. Like the so-called Indian lycium and many other substances, in which the distinction of genuine from counterfeit is difficult to make, these should be collected by people who travel to the countries in question, procurators and senators who govern there, or even by friends living in these countries, as you have seen me doing. Thus some substances are brought to me from Syria Magna, some from Palestine, some from Egypt, some from Cappadocia, and others from Pontus, as also from Macedonia and the countries to the westward, where live Celts and Iberians, and the Moors (*Maurusii*) who inhabit the land opposite.

Now Dioscorides and others have given a true description of all the finest drugs that grow in each country, while we, as I say, have to prepare them in the way stated, especially if we live in Rome, where enormous quantities arrive every

year from all nations. Some also occur spontaneously in Italy itself, while others are prepared there. . . .

[He now proceeds to speak of various ingredients, wine, honey, etc., which have to be added to the theriac.]

Chapter IV

. . . Hence by far the best honey to put into antidotes is that of Hymettus or Thasus, or that from Attica in general. And if ever we cannot get the latter, then that from the Cyclad islands, which most resembles it. On the Isthmus also occurs a good honey, which is specifically called Isthmian after the country. These are all famous. And magnificent honey is also found in other countries, although owing to its scarcity it is all eaten by the natives, so that nothing remains for exportation to other lands, and hence it is unknown. In fact in my own district, between Pergamum and the coast town Elæa is a hill covered with thyme, from which the bees collect very fine honey; this is consumed locally. The hill lies to the left as one travels from Pergamum to Elæa, but not near the road.

ON PROGNOSIS

[Despite the similarity of titles, this book has very little in common with the "Prognostic" of Hippocrates. It is no straightforward presentation of "clinical pictures" objectively written. Couched in the form of an epistle to a friend, it is primarily a chapter of Galen's autobiography, in which, while severely criticising his contemporaries, he recounts his personal achievements in the art of medical prognostication. The attacks on his medical rivals, together with parallel passages of self-laudation, recur at intervals through the treatise. Galen indeed did not suffer fools gladly, and while it may be admitted that his criticisms were often in substance justified, it must also be conceded that he himself was by no means free from that spirit of "contentiousness" or φιλονεικία for which he is constantly blaming others.

As already pointed out, Galen's critique of social life in Imperial Rome often reminds us of the "Satires" of his predecessor Juvenal. Juvenal, however, never accompanied his invectives with self-glorification to anything like the same degree as Galen. Even the homage which our author from

time to time pays to Hippocrates as his master in the prognostic art does not sufficiently excuse this trait.

Apart from this, and apart from the value of the medical problems discussed, the present treatise is quite a useful commentary not only on the status of the medical profession, but on life generally at Rome in the second century A.D. In medical thought at this epoch there seems to have been a general lack of time-sense, an inability to see disease-phenomena in their historical aspect. Symptoms were apparently treated as they occurred, without reference to what had gone before or what was to come after. Galen is very severe—and rightly so—on this tendency. Any system of medicine which becomes deeply affected by it loses all claim to be designated a science or an art.

It is not surprising to find that here, as in Hippocrates' like-named treatise, cases of malaria bulk largely. Apart from the frequency of the disease in Græco-Roman times, the characteristic periodicity of its attacks made it a particularly useful subject for prognostic study.

Eudemus, the Peripatetic philosopher, who in the following pages is shepherded by Galen through three attacks of quartan malaria, was, like himself, a Pergamene. Eudemus' description (in Chapter IV) of the life of great cities in comparison with that of smaller towns, " where everyone knows everyone else," is well done; in fact it is by itself a document of no small sociological value.

Chapter VI includes two good cases of what may be called " psychotherapy in general practice." They illustrate the effect of worry on the general nutrition, and particularly on the pulse. The pulse was a subject which Galen had made his own; as we see in the present treatise, he also constantly uses it in the diagnosis and prognosis of fevers. In his study of the pulse he had been much beholden to the writings of Archigenes, a Pneumatist physician who flourished under Trajan.

The eleventh chapter gives a description of Galen's first meeting with the Emperor Marcus Aurelius. It is somewhat amusing to find that the Stoic potentate could sometimes " unbend " so far as to overeat himself.

In the last extract (Chapter XIII) Galen again uses his general powers of observation to good purpose, and incidentally gives a demonstration of how the working of the *vis medicatrix naturæ* may often render human interference supererogatory.]

Greek text: Kühn, Vol. 14.

Chapter I

[Low aims in Medicine at Rome. Social Decadence.]

How impossible it is, Epigenes, for the majority of physicians to foretell what is to happen to their patients in each disease. For, not only in Medicine but also in the other arts, those who aim at seeming rather than being are in a majority. Hence the finest aspects of these arts are neglected, and what is chiefly practised is how to shine before the crowd, to speak and act with a view to pleasure, to flatter and address the rich and powerful day by day, to accompany them, escort them home, act as menials at their feasts, and play generally the buffoon. Some not in this way only, but by the costliness of their clothes and rings, by the abundance of their retinue, by their equipment of silver vessels, persuade the laity that they are to be envied. . . . They announce that they will teach the arts in a minimum of time, and they gather together a host of disciples; from these also they acquire power in the cities where they live.

This misfortune then, common to all the arts, has taken possession of modern life. The misfortune of Medicine has many aspects, but there is one point in it which I have resolved to deal with, since it belongs to what chiefly concerns myself. Should any one of the physicians who have learned medicine in the customary way forecast the occurrence in the patient of delirium, of a rigor, depression, hæmorrhage, ear-abscess, or other kind of deposition [*apostasis*, " abscession "] in any part, an attack of vomiting, sweating, intestinal disturbance, syncope, or anything of the kind, he appears to the laity some strange monstrosity on account of the novelty of his behaviour. So far, in fact, from earning their praise, the prognosticator may be glad if he is not taken for a sorcerer (*goês*). Some few there are, on the other hand, who, while they do not reject this point of view (*theoria*) as impossible, yet straightway ask the forecaster himself, as well as other doctors, whether this sort of thing was known also to the older authorities or is simply a discovery of the forecaster himself. Thereupon those physicians who conceal their stupidity, as also perhaps some who are really ignorant, must needs say that none of the ancients ever wrote any such thing, and that he who brings forward such a forecast (*prorrhesis*) is a wizard. And the

prognosticator himself does not dare to say that this subject was treated by many of the ancients, and especially by Hippocrates, our leader in everything that is of good repute, for he is abashed before the doctors present, and apprehensive of their dislike. Nor does he dare to say that he himself found out the method; for in that way he would be lying and would also be disliked all the more by them. And if anyone submits a problem which is unanswerable from every point of view, and then hesitates and deliberates, in my opinion he but increases for ever afterwards the suspicion that he is a sorcerer. Finally, he awakens such envy against himself that they will plot against him. First they will try drugs; and secondly they will try the method by which Quintus was taken—he who was the best physician of his time, but was driven from his city on the charge of having killed his patients. . . .

Take, therefore, those who are thus ill-prepared, as well as others who have a pure regard for truth, not by reason of its externals but for itself alone. Necessarily when many of these once experience the injustice which governs present-day life, and see clearly that they will be no use to mankind, they desert the rabble, and seek at least to save themselves, as though from a great storm and raging tempest. These people, unknown to the multitude, yet known and beloved, first and foremost by the gods and next by the best of mankind, pass their days in quietness, leaving it to the knaves to shine before the crowd.

The cause of all this happening to people is the love of luxury [*tryphé*, effeminacy] which reigns among the rich and powerful inhabitants of cities. Those who esteem pleasure before virtue set no store on people who possess any finer knowledge and who are able to guide others. They are one and all in the hands of *the dispensers of pleasure;* these people they enrich and admire and elevate to high rank. Thus they make statues to dancers and charioteers, setting them up beside the images of the gods; while to people of education they only give so much honour as they have use for them. To the element of beauty which exists in everything they pay no regard. Nor indeed do they even attach themselves to men of skill; of geometry and arithmetic they make use merely for reckoning their expenses, of astronomy and divination only for forecasting whose money they are going to inherit; and similarly, of music merely for the auditive pleasure it gives. As to philosophy, which holds precedence among all these subjects, there is not in their eyes any need for a demon-

strative method of approach [logic], except in so far that utility leads some rhetoricians to make use of a rascally resource, the so-called *sophistical* method. Philosophy itself they hold in no esteem; they reckon it of all studies the most useless—it is like " boring holes in millet-seed."

These then are the people who see in medicine also only its necessary utilitarian aspect; and even this they do not see properly. As Plato says, if children or witless people had to judge between a physician and a cook, the cook would come off best by a long way !

Chapter II

[Galen forecasts three successive attacks of quartan malaria to the day. Other Roman physicians interfere. Note that to Galen the seventh day of a quartan fever was most important, the fourth being, as it were, a herald of this. In the present account the second attack was, in accordance with his prophecy, duplicated by the *theriac* which his rivals administered.]

Of these facts I was unaware on my first visit to Rome. Hence without any suspicion I gave not merely verbal but practical demonstrations of prognosis and treatment, until the following event took place, as you yourself [Epigenes] know—you who were present throughout almost the whole illness of Eudemus the Peripatetic philosopher from beginning to end. One day after his bath he began to feel somewhat indisposed, and at the eighth hour he had a shivering, which prevented his taking food. Next day, although having nothing to complain of, he thought it safer to pass over the eighth hour. As at that time nothing troublesome happened to him, and, when he waited till the ninth hour and longer, still no change appeared, he then took his bath and had a little food. On the third day, according to his custom, he came to visit me. For safety's sake he thought it as well on that day also to let the suspected hours go past. So after the eighth hour he bathed and had a comfortable meal, and felt sure that nothing unpleasant was going to happen to him. On the fourth day, he was with me and was getting ready for his bath; smiling, and, looking at you, he said, " Will it be safer to-day also—this being the fourth day—to let the eighth hour go by

again, or shall I take my bath now?" You then, expecting no trouble, told him to go and bathe. And so said all the others who were present, but I alone said nothing. And when he asked me the reason for my silence, I answered that I was not quite free from suspicion that there had been a beginning of a quartan fever [*period*, cycle] on the first day, when he had told me to feel his pulse. "But (I said) from the fact that I had never previously known the normal state of your pulse —without which it is not possible to have the further knowledge of its slight deviations towards the abnormal—I made no definite statement; similarly now I can say nothing further about the suspicion that I then had."

He then bathed in comfort and took a fair meal. Later in the evening he sent for me and again asked me to feel his pulse; I made the same statement as I had done before his bath, and I made it with still more decision than then. Hence he thought it well that on the next date, which would be the seventh day from the commencement but the fourth from that [on which we were conversing] he should watch still more carefully. So having stayed at home he took his bath and had a meal, several people saying, as you know, that he had absolutely no fever. When I was asked by you (you, of course, remember this as well), I now expressed my suspicion that a very slight attack of quartan ague was beginning in him. I then left, as I had to visit a patient that evening who lived some distance away. Meanwhile Eudemus, having bathed and straightway taken his meal, shortly thereafter felt a warmth all over his body. This, he thought, came from what he had had to drink, as he had taken old wine on the previous day. This fact he explained to his usual medical attendants, and they also at once blamed the wine. So, thinking that he would have no further trouble, on the fourth day after the occurrence of this warm feeling, he bathed and took his usual meal; he now began quite clearly to fever, and realised that this was an attack of quartan ague.

Henceforward he praised me alone for having accurately gauged the pulse on that previous occasion. . . .

. . . . . .

When the paroxysm at this period increased in severity, he brought together the best physicians in the city and asked them to consider the *treatment of* the disease. I was by my own wish left out, not being desirous of engaging in disputes with them. But when the most reputed among them had

made up their minds that the patient should drink *theriac* on the morning of that day on which it was expected that the quartan paroxysm would take place, they then went off, as you know. In your presence Eudemus now asked me what hope I had of the medicine proving useful. You are aware that I answered him, without ambiguity, that not only would the medicine be of no benefit, but that it would make the quartan attack double. When he asked my reason for this answer, I said that the disease was still unconcocted, and that while this drug might, especially at the beginning of winter, lead a harmful unconcocted humour to cause irritation, it could certainly not bring about complete coction or dispersion. Such then was my answer to Eudemus.

And on the morning of the next day they came to him, before I had arrived, and gave him the medicine, he feeling ashamed to tell them what I had said to him, and at the same time observing that all the doctors who came promised that the drug would benefit him very considerably. Then, when the paroxysm came on at the same hour they said that this sometimes happens the first time the medicine is taken, as the disease is thus moved and disturbed; but when one takes it a second time the disease vanishes entirely, if the medicine be taken on the morning of the day on which the quartan paroxysm is expected to occur.

Having said this, the doctors went off in good hope. The ague, however, did not wait for the next period, but unexpectedly made its attack at the eighth hour, more violently than on the previous day. And when the doctors arrived in the morning they thought it well, as you know, to administer the medicine a second time; moreover, during the day they gave an amount in correspondence with the previous paroxysm. They then took their departure. . . . After this he asked me in the evening what I expected was going to happen. Then, as you know, I investigated the action of his arteries and said: "At present I am not in a position to give a definite answer to your question, but I shall perhaps be able to do so tomorrow morning, when I have seen the whole quantity of urine passed during the night." So I came in the early morning, and, having inspected the urine, told them not to trouble about any urine he might pass in the meantime, and that I would come back at the fourth hour. Then, indeed, on my arrival, having observed his urine and felt his pulse yet more carefully, I declared that he would have a third paroxysm

of quartan fever about the same hour. I then left. A little later Eudemus was visited by Sergius and Paulus (the same who became not long afterwards lieutenant of the city), also by Flavius, himself already a consular, and like Paulus an enthusiast for the Aristotelian philosophy. Eudemus told these men all about me, and said he was worried about that day's forecast regarding the approaching paroxysm, but that he was carefully observing how it should come about.

And when this paroxysm occurred at the same hour as the previous ones, Eudemus marvelled, and he related to everyone who came to see him the predictions I had made. These visitors were almost all men of eminent position and education in Rome.

. . . . . .

Chapter III

[Eudemus is given up by his regular medical attendants, but Galen continues to visit him. Other physicians accuse Galen of having used divination or sorcery in his predictions. Despite their gloomy prognosis, Eudemus is completely cured. Galen gives him a full explanation of how he arrived at his diagnosis and prognosis. Eudemus extols Galen and discredits the rival physicians.]

I return to the case of Eudemus. He was thoroughly exhausted by the three attacks of quartan ague, and the doctors had given him up, as it was now mid-winter. Personally, however, since he was my teacher, but also since I happened to be living near him, I was obliged to attend to his summons twice daily. On this occasion I was held up to scorn by Antigenes, one of the pupils of Quintus, and also an associate of Marinus. He was considered to be the leading physician, and had everybody of high standing amongst his patients. For some reason or other he said derisively to my supporters that in a little while they would realise what kind of a man they were praising, when they saw Eudemus carried out for burial! While he made these remarks to the laity who were present, from time to time he broke off his discourse and, looking towards the physicians, said that, although Eudemus was now in his sixty-third year, and had had three quartan paroxysms in the middle of winter, "yet Galen undertook to cure him!"

Now, my dearest Epigenes, I know that you are constantly extolling both the later predictions that I made about him and also the treatment I applied. Against me, however, there now arose the first occasion for jealousy, since the people admired me for the dignity of my life, as well as for my professional attainments. Thus when the first of the three quartan attacks had begun, and I foretold that it would end on such and such a day, I awakened surprise, and when I also succeeded in forecasting the resolution of the second attack, everyone was amazed. In the case of the third attack, however, they prayed the gods that I should fail. But when this also came to an end on the day I had foretold, I gained considerable reputation not only for my forecasts but for my treatment.

Hence Antigenes was all but humbled to the dust for the blasphemies he had so rashly uttered against me. So it was also with Martianus, who himself at this time had long had the reputation among young physicians of being a great anatomist; two books written by him on anatomy were also famous. This man was annoyed with Eudemus for saying that I deserved not merely praise but admiration from everybody, and he calumniously maintained that all my forecasts had been produced not by medicine, but by divination. And if anyone asked him what kind of divination he meant, he said either that from the flight of birds, or from sacrifice, or else that from symbols or mathematics.

What finally happened in the case of Eudemus was this. The third of the quartan attacks persisted on the day on which I had foretold that he would get complete release from it. Then Martianus came to Eudemus at the ninth hour and declared that the present paroxysm was not merely a little, but very much more severe than the previous one. He then went off abruptly, with a cheerful face, showing obvious pleasure that my prognosis had been wrong. But Eudemus felt a greater well-being (*euphoria*) than before; he was, in fact, well pleased and did not think that my prediction was going to prove wrong; so he waited the arrival of some other doctor. And not merely one but even two and three came, for they had all been watching to see what was to happen in the matter of the prognosis, and they were praying that at least in the third attack my forecast should fail, as well as the treatment based on it. So Eudemus asked them also to say how they thought he was getting on, and receiving the same answer as that given by Martianus, and observing that they,

like Martianus, had become rather cheerful, he himself realised that they were pleased because they thought that the prognosis and treatment had proved wrong.

And since I was delayed for an unusually long time at a patient's, he kept sending for me—my house being, as I say, not far off—and requesting me to explain his feeling of well-being. So when I arrived, he did not wait for me to sit down, but stretched out his hand, asking me to feel his pulse. And when I had felt it carefully he inquired what my verdict was. Smiling, I answered, "What else than a favourable one?" "Tell me," he said, "more exactly what you mean." "If I give you," I replied, "a general idea of the matter, will that not be enough to make you satisfied about the future?" "Not at all," said he; "I demand to hear the details as well." "Listen then. To-night you will become completely free from the whole morbid condition, following which there will be a resolution of all supervening and future symptoms. And I say this because the nature (*physis*) which governs your body has just made clear to me, by means of your pulse, that it is now awake and stirring, and is about to expel from your body everything that is noxious in the humours." "But how can you say that this has been made clear to you by *nature?* It surely did not say this to you in actual words. Give me an answer; you know well that I follow reasoning better than all these wretched physicians." "Because," said I, "it has caused an upward movement of the arteries rather than a lateral expansion, and this it always does when proceeding to discharge irritating material from the body." To this Eudemus rejoined: "But nature has appointed many paths of discharge: thus vomiting, alvine evacuation, perhaps excessive urination, and discharge of abundant sweat, hæmorrhage, and ordinary bleeding piles all produce wholesale evacuation. It is the business of your art to explain to me the reasons for the particular kind of evacuation." "An approaching hæmorrhage," said I, "is preceded by such and such signs; and so similarly with a sweat." I also discussed the signs which precede an attack of vomiting. "We have no special distinctive sign for a wholesale critical evacuation from the lower bowel. But since none of the other signs is present, it remains to hope that this is what is to happen in your case." "You have arrived," said he, "at your prognosis in a most logical way."

When evening came we were still discussing this subject

together. And you yourself arrived in the morning and were told the chief points about my prognostication. Meanwhile the philosopher, giving up his usual quiet manner of speaking, shouted to everyone of his friends as they arrived, " The Pythian Apollo has desired, through the mouth of Galen, to prophesy to the sick, as well as to treat them and to cure them entirely on the day foretold. Galen announced long ago the coming resolution of my trouble—I am certain that I am now completely well—and he has been correct both in his forecast and his treatment. He cured me of three attacks of quartan ague, which I had incurred through drinking theriac at the wrong time. When the proper time for it came, these people said not a word, but he gave it me, and cured me, while they laughed him to scorn for thinking he could cure an elderly man of three attacks of quartan ague in the winter-time ! "

Chapter IV

[Public appreciation of Galen. Martianus shows his jealousy and ill-will. Galen appeals to Eudemus. The latter gives him an explanation of the ignorance and spitefulness of the Roman physicians. Adventurers in big cities as contrasted with small.]

When those unversed in medical matters heard of this, they judged that I was going to be a public benefit to the inhabitants of Rome, and were all delighted. Martianus, however, who claimed to be not merely a physician but a friend, heard of my previous day's statement about the arterial action. The doctors had considered this disturbed, but had no suspicion that it betokened a crisis. When they found Eudemus in perfectly normal health, Martianus did not even trouble himself to give me a word of praise. On his way to the Sandalarium he happened to meet me, and at once, without greeting me in his usual manner, he asked me whether I had read the second book of the " Prorrhetics " of Hippocrates, or whether I was completely ignorant of the work. I told him I had read it, and that it seemed to me those physicians were right who did not think it belonged to the genuine works of Hippocrates, and that they were justified in saying so. " At least," said he, " you know quite well what is written in it. Personally I do not make prophecies like that." " Why do you say that? " I asked. " Because," said he, " when you parted from

Eudemus lately, he said he was amazed at the way you had felt his pulse yesterday evening and foretold that he would have a discharge from the lower bowel, after which there would be no more fever." When he said this I merely answered, " You heard this from Eudemus and not from me," and I at once went off. Then, going to Eudemus, I told him what had happened, and I expressed surprise at the ill-will shown by the distinguished doctors of Rome. He said that what had happened to me was quite what might have been expected, and he contrasted the doctors in our own country with those here, who for several causes have attained to the acme of bad manners (*cacoethia*). And then he enumerated these various causes in the following terms :—" Do not suppose that good men become wicked in this city; but those who are already wicked find here opportunity for business and make much more money than in provincial towns. When they see many like themselves who have become rich, they imitate their diverse practices, and so from various causes they attain to an extreme of rascality. And I will tell you some of these causes, as I have had a long experience. It is not nature alone, nor is it that the wickedness of those naturally wicked is increased by the opportunity for material gain. There is also a corresponding training (*mathēsis*) in the ways of wickedness. People see wickedness daily practised by others like themselves, and so they proceed to imitate them. . . .

" On the other hand, people in small towns, unlike those here, are not led astray by opportunities for great gain, as they are easily recognised by their fellow-citizens, and even if they do commit some minor fault, they have no practice in the theory. Here at Rome, however, the mere fact that their successive wrongdoings are not known to everybody serves to increase their natural depravity. They attack those who from lack of experience do not know them, especially when these are unable, owing to their simplicity of mind, to retaliate in the way in which these attack each other if they have the slightest wrong done them—and just as the brigands in our country help each other when outsiders wrong them, and spare their own people, similarly those who make their conspiracies here amongst us differ from brigands only in that they carry out their misdeeds in the town and not among the mountains."

" Well," said I, " as for my own plans, you have already heard these often. As soon as the sedition in my native country is ended, you will see me at once leaving this city. I shall

stay here only a short while now, so that I may be the more quickly free from the rascality of these wicked people."

"They are unaware," said Eudemus, "of this intention of yours. If they find out, they will all suppose, being liars themselves, that you are lying like them. Further, since they themselves are needy and uneducated they cannot stay in their own countries, but as they have learnt all the various tricks I have mentioned they come to this city. They think that it is for the same reason that the others have also come, and they suppose that others will not leave before amassing money. If they are told by the townspeople about your origin and your possessions, and that you are not one of the needy, they will say that all this has been trumped up in order to swindle your hearers. For they expect to find done everywhere what they do themselves."

Eudemus said this, and more to the same effect; he added that if they were not able to harm me by unscrupulous conduct they would proceed to attempts at poisoning. Among other things he told me that, some ten years before, a young man had come to the city and had given, like me, practical demonstrations of the resources of our art; this young man was put to death by poison, together with two servants who accompanied him.

"My dearest teacher," said I, "I am obliged to you for telling me about all their iniquities. I will look well after myself. I will encounter them, and then, having shown up their ignorance, I will leave this great and populous city, and go to a small and thinly peopled one, where we all know each other, where we know from what people we spring, what our education is, our possessions, and our manner of life."

Chapter VI

[Galen's ingenious diagnosis of the cause of insomnia in a woman, and of bodily wasting in a household steward. Importance of realising how mind affects body, and notably how mental excitement disturbs the pulse.

It is noteworthy that Galen, in making his diagnoses here, first rules out a possible physical cause in both cases (*e.g.* "black bile" in the case of the woman) before concluding that the causation is entirely mental.]

I was called in to see a woman who was stated to be sleepless at night and to lie tossing about from one position into another. Finding she had no fever, I made a detailed inquiry into everything that had happened to her, especially considering such factors as we know to cause insomnia. But she either answered little or nothing at all, as if to show that it was useless to question her. Finally, she turned away, hiding herself completely by throwing the bedclothes over her whole body, and laying her head on another small pillow, as if desiring sleep.

After leaving I came to the conclusion that she was suffering from one of two things: either from a melancholy dependent on black bile, or else trouble about something she was unwilling to confess. I therefore deferred till the next day a closer investigation of this. Further, on first arriving, I was told by her attendant maid that she could not at present be seen; and on returning a second time, I was told the same again. So I went yet a third time, but the attendant asked me to go away, as she did not want her mistress disturbed. Having learned, however, that when I left, she had washed and taken food in her customary manner, I came back the next day, and in a private conversation with the maid on one subject and another, I found out exactly what was worrying the patient. And this I discovered by chance.

After I had diagnosed that there was no bodily trouble, and that the woman was suffering from some mental uneasiness, it happened that, at the very time I was examining her, this was confirmed. Somebody came from the theatre and said he had seen Pylades dancing. Then both her expression and the colour of her face changed. Seeing this, I applied my hand to her wrist, and noticed that her pulse had suddenly become extremely irregular (*anomalous*). This kind of pulse indicates that the mind is disturbed; thus it occurs also in people who are disputing over any subject. So on the next day I said to one of my followers, that, when I paid my visit to the woman, he was to come a little later and announce to me, "Morphus is dancing to-day." When he said this, I found that the pulse was unaffected. Similarly also on the next day, when I had an announcement made about the third member of the troupe, the pulse remained unchanged as before. On the fourth evening I kept very careful watch when it was announced that Pylades was dancing, and I noticed that the pulse was very much disturbed. Thus I found out

that the woman was in love with Pylades, and by careful watch on the succeeding days my discovery was confirmed.

Similarly too I diagnosed the case of a slave who administered the household of another wealthy man, and who sickened in the same way. He was concerned about having to give an account of his expenses, in which he knew that there was a considerable sum wanting; the thought of this kept him awake, and he grew thin with anxiety. I first told his master that there was nothing physically wrong with the old man, and advised an investigation to be made as to whether he feared his master was about to ask an account of the sums he had entrusted to him, and for this reason was worried, knowing that a considerable amount would be found wanting. The master told me I had made a good suggestion, so in order to make the diagnosis certain, I advised him to do as follows:— he was to tell the slave to give him back all the money he had in hand, lest, in the event of his sudden death, it should be lost, owing to the administration passing into the hands of some other servant whom he did not know: for there would be no use asking for an account from such an one. And when the master said this to him, he felt sure he would not be questioned. So he ceased to worry, and by the third day had regained his natural physical condition.

Now what was it that escaped the notice of previous physicians when examining the aforesaid woman and the aforesaid slave? For such discoveries are made by common inductions (*epilogisms*) if one has even the smallest acquaintance with medical science (*theoria*). I suppose it is because they have no clear conception (*diagnosis*) of how the body tends to be affected by mental conditions. Possibly also they do not know that the pulse is altered by quarrels and alarms which suddenly disturb the mind.

Chapter X

[Galen forecasts the probable dates of successive febrile attacks in another case of quartan ague. Failure of attempts to confute him. He points out that there is nothing really marvellous in his prognoses; these are merely based on simple numerical reckoning, which apparently his rivals are unable to make.

It will be noted that here again as in the case of Eudemus in

Chapter II, the fourth day is that on which the prognosis is made. Galen reckoned that if there was a turn for the worse on the fourth day, the crisis might occur on the sixth instead of the seventh day, although this was rare.]

Now Sextus, son of Antoninus, became so acutely ill that he did not manage to pass the seventh day without a crisis. The prognosis in this case has been dealt with in my commentaries " On Crisis," where also it is explained that the crisis often occurs prematurely, without awaiting the actually critical day. I recognised on the fourth day that this might happen to Sextus, and I said so to Pitholaus, the chamberlain, when he asked what prophecy I would make about the future. This man consulted me after having ascertained that I had foretold many things which seemed impossible to the wisest physicians.

So I answered him laughing that the disease could not go further than the seventh day, while the crisis would certainly come either on the sixth or seventh day. If on the sixth, it would recur; if on the seventh, there would be a definite crisis; also necessarily this would take place by way of the sweat. And when the crisis thus occurred on the sixth day, Sextus, who was remarkably obstinate, in order to confute me by not having a relapse, bathed every day, drank no wine, and took nothing but strained barley-gruel, either by itself or with breadcrumbs; often plain bread moistened in water sufficed him. When he had done this up to the twelfth day, he then boasted that he had overthrown my prognosis. On the thirteenth day, at the third hour, he drank a little weak wine, making at the same time the whole diet slightly stronger than before, although still keeping it thin. But on the next day—being the fourteenth from the first time he lay down—he began to fever. He gave orders that I should not be told, as he thought that the fever would not be severe and would not continue more than a day. But when, as the day went on, the fever kept getting more acute, then Claudius Severus, on returning to his house, which was near that of the patient, heard that he was fevered, and went to him. Finding him now in a high fever, he first asked what he thought my opinion was about the origin of the fever; and learning from him the truth—namely, that out of obstinacy he had forbidden anybody to go and tell me—Severus sent for me to see Sextus, and thereafter to come to him. This being done, he questioned me

as to my views on the relapse. My answer was what I had also predicted to Sextus; that after three days this attack would be over, the fever having by that time reached a sufficient degree of warmth, and that then the crisis would come on the seventeenth day from the commencement. Sextus was glad to hear that the resolution was to come quickly, and he readily believed it; for, of course, what a man wishes, this he thinks will happen! Severus, on the other hand, while believing I was right in saying that Sextus would be cured, yet had doubts about the day on which the patient was to be entirely quit of his malady. He thought it difficult without waiting till at least the next day to state anything definite about what was to happen on the fourth day.

Being of this mind, he sent a messenger at daybreak to Sextus's house to await me and bring me to him after my next examination of the patient. And when I had seen Sextus, and come to him [Severus], he said, " Do you now contradict what you said yesterday, or do you adhere to your statement?" I told him that I held to my opinion even more than yesterday. So after luncheon he once more sent for me, and asked me again if I was absolutely certain that Sextus was going to have a crisis. I told him I could maintain this even more firmly than yesterday. And when also on the second day he asked me whether I still kept to my previous declaration, or had in any way shifted my ground, I told him that I would not move in the least, but could even add something to my statement. On his inquiring what this was, I told him that, when the seventeenth day was over, the sweating would begin at the second hour of night. " Have you," he said, " also told Pitholaus that? " I answered that I had told him, and that he at least was convinced that I was not going to be wrong either in my prognosis or treatment. " Well then," said he, " Pitholaus will certainly also have told the Emperor! " " He may have," I answered, " but personally I am not concerned with my reputation among such people. I do not go about extolling my forecasts and treatment, so as to earn more hatred than ever from physicians and philosophers and have them calling me a wizard, a prophet, or the like. But to you, my friends, who deprecate such foolishness as theirs in medicine, I would point out that the art is worthy of Apollo and of Æsculapius, but that these physicians insult it; just as those philosophers insult philosophy who, although living no better than any ordinary persons, yet attach to themselves the august name of philosophy."

Such were my words to Severus. You, Epigenes, however, know the maliciousness of nearly all the physicians, who obviously pray for my failure, and send people the whole day long to find out and to report to them everything that goes on. They did not know that I had predicted to Severus and Pitholaus that the approaching commencement of the crisis would show itself that evening. And when about the seventh hour they learned that Sextus had an increase of fever, they laughed derisively and were manifestly delighted. To everyone they met they said with a sneer that Galen's wonderful prophecy was proving entirely false. When, however, the crisis occurred as I had the day before predicted, they were all in their turn put to shame.

Still there was nothing wonderful in this prognosis, as I showed you firstly in my commentaries on the " Epidemics," as also in my work on " Crisis." But not only do these physicians know nothing of the writings of the ancients; they are unable even to reckon the days after the seventh, especially if the patient has become free from fever and then again gets a relapse. . . .

Chapter XI

[Galen is consulted by Marcus Aurelius himself, who has gastro-intestinal symptoms which his ordinary physicians attribute to incipient fever. Galen, however, on feeling the pulse, tells him that he is suffering from indigestion. The Emperor profits by his advice, and expresses delight in his frankness; he contrasts Galen favourably with the other physicians.]

What happened in the case of the Emperor himself was really wonderful. His own opinion and that of the physicians of his entourage who had gone abroad with him was that some febrile paroxysm had begun. But they all proved wrong both on the second and third day, in the morning and at the third hour. He had on the preceding day taken a draught of bitter aloes at the first hour, and then some theriac as was his daily custom. Next he took some food about the sixth hour, washed at sunset, and had a small meal. During the whole night there ensued colicky pains with intestinal evacuations. This made him feverish, and when his attendant physicians observed this, they gave orders that he should be

kept quiet; then they prescribed slop diet at the ninth hour. After this I was myself also summoned to come and sleep in the Palace. Then, when the lamps were newly lit, a messenger came to call me at the Emperor's bidding. Three doctors had been observing him since about daybreak, and two of them feeling his pulse, and they all considered this the beginning of a febrile attack. I stood by, however, without saying anything; so the Emperor, looking at me first, asked why, when the others felt his pulse, I alone did not do so. I said to him, "Two of these gentlemen have already done this, and probably when they were abroad with you they already learned by experience the characteristics of your pulse; hence I expect they will be better able to judge its present condition (*diathesis*)." On my saying this he bade me also feel his pulse. It seemed to me that, taking his age and constitution into account, the pulse was far from indicating the beginning of a febrile attack. I declared that this was no onset of fever, but that his stomach was overloaded by the food he had taken, which had turned to phlegm prior to ejection.

My diagnosis seemed praiseworthy to the Emperor, and he repeated three times in succession: "That's it. It is just what you say. I feel I have taken too much cold food." And he asked what was to be done. I answered what I knew, and said to him: "If it were anyone else who was in this state, I should follow my custom and give him wine sprinkled with pepper. But in the case of kings like yourself, physicians are in the habit of giving safer remedies; hence it will be enough to apply over your stomach some wool impregnated with warm spikenard ointment." The Emperor said that in any case when his stomach was out of order he was in the habit of applying warm spikenard ointment enveloped in purple wool. So he gave orders to Pitholaus to do this, and to let me go. When this application had been made, and his feet thoroughly heated by rubbing with the warm hand, he asked for some Sabine wine, sprinkled pepper in it, and drank. He then declared to Pitholaus that he had "one physician, and he was a perfect gentleman." Further, as you know, he keeps constantly saying about me that I am "first among the physicians and alone among the philosophers." For he had already had experience of many who were not only mercenary, but also quarrelsome, conceited, selfish, and malicious. . . .

Chapter XIII

[A case in which there is general agreement that bleeding is indicated. Galen points out to the doctors, however, that even without this operation, nature itself will bring about a crisis by hæmorrhage. He judges by the patient's symptoms that there will be bleeding from the right nostril. Despite the scepticism of the other doctors, this proves correct.]

Further, what happened in your presence when some of the leading doctors in Rome were thinking of opening a vein is discussed in my commentaries; this is a subject which has been very completely dealt with by Hippocrates. The young man was passing through the fifth day of his illness, and the resource of phlebotomy had obviously been omitted, as this should be carried out early in the disease, on the second, third, or at latest the fourth day. Since, therefore, neither the season of the year, the patient's age, nor yet any lack of vital power, nor previous treatment of the malady contraindicated, but all the factors combined to indicate venesection, the physicians resolved to open a vein, and in this they decided fittingly. And I, after considering carefully all the obvious signs indicative of phlebotomy as given by Hippocrates, declared that they had done well in determining to withdraw blood. I added, however, that apart from this, nature (*physis*) was also on the point of expelling what was oppressing it, and that this would undoubtedly happen at once, even if we did nothing!

Now when the doctors heard this they were indeed surprised.

Then the patient rose up in bed as though he wanted to jump out. And, being asked why he did this when there was nothing to be afraid of, he said that he saw a red snake creeping from the ceiling, and feared that it might lose its hold and fall on him; hence his attempt to get away from the spot where he lay. Now the physicians did not think that this had anything to do with the hæmorrhage which was impending. I, however, among other careful observations, noticed that a redness, hitherto faint, from the right side of the nose to the cheek, had become much more pronounced; therefore there seemed an extreme likelihood that a hæmorrhage would take place from the right nostril. So I spoke quietly to one of the patient's slaves present, and told him to have ready under his cloak a vessel suitable for receiving blood.

Next I said aloud, in the hearing of all the physicians, that if they waited a very short time they would see the patient's right nostril beginning to bleed. Then they laughed at me for including the right nostril in my prognosis, but I said, "The fact is, either both must happen, or I must be wrong in both. According to the theory both must be included in the prognosis—that the patient will have a hæmorrhage, and that this will be from the right nostril." . . . Then, on seeing the patient put his finger into his nostril as though tickling it, I told the man who had the hidden vessel to be on the watch, so that when he saw blood flowing from the nostril, he might run up and hold the dish under it. As I said this, the patient drew out his finger stained with blood, and the domestic ran up and held the vessel for him.

Hereupon, as you know, there was a great shouting and all the physicians hurried away. I, however, explained, in answer to your question, the whole theory of prognosis, as I had learned it from the statements of Hippocrates. And I added further that the bleeding was likely to be severe; for the natural urge (*hormé*) was strong, and the disease unconcocted; from such causes excessive evacuations result. Hence I thought it better to wait a little time with the patient, while I sent the slave who accompanied me to fetch a large gourd. A considerable quantity of blood quickly collected in the vessel. I then asked for another, and on receiving the blood, I noticed that the weight of what had been evacuated was $4\frac{1}{2}$ lbs. I kept the patient elevated, bade him sniff sour wine and water into his nostril, applied a sponge soaked with cold honey and water to his face, and bandaged his limbs. But none of these proving of any use, I applied the gourd to the right hypochondrium, and this immediately checked the hæmorrhage. . . .

THE EPILEPSIES

("On the Parts Affected," Book III, Chap. XI.)

Greek text: Kühn, Vol. 8.

[Galen deals here with a difficult subject, which still even in our own day is very much *sub judice*. He rightly considers epilepsy a disease or symptom affecting mainly the central nervous system. The disease has, in his opinion, three chief varieties, and he begins with that which we now call Jacksonian

or cortical epilepsy, and which is thought to be due to localised irritation of part of the brain-cortex. The theory of Galen's Smyrna teacher Pelops, given here, was that, on the analogy of snake-venom, one had to do with a humour, pathologically formed locally, which gave off some kind of " force " or emanation, this again being transmitted from part to part till the brain was reached.

Regarding " sympathetic " epilepsy—in which the brain becomes only secondarily involved—Galen gives his own theory. He suggests that the brain is here irritated by substances sent up to it from the parts " primarily affected," and that the symptoms are its convulsive efforts to repel this invasion. The analogy that guides him here is hiccough, where the stomach makes similar convulsive efforts to rid itself of offending matter.

In the third or " idiopathic " variety of epilepsy, he holds that the brain is primarily at fault, and that the condition in it is some kind of *dyscrasia* of its humours, produced by over-much cold (a " chill "); allied to this pathologically are lethargus, phrenitis, and various insanities. Apoplexy, on the other hand, is a more localised condition due to effusion of fluid into the ventricles of the brain.

Our author ends with a useful clinical note on the grave significance, in diseases involving stupor, of impairment of the breathing.

One or two points regarding the nomenclature here employed may be worth remembering. " Epilepsy " meant in Greek primarily nothing more than a " seizure," and had many other connotations besides the medical. (Cf. pp. 1–2.)

In *tonus*, or tonic convulsion, the spasm is one and continuous, whereas *clonus* consists of short rhythmic spasms [clonic] with intervals between.

Aura means literally air in motion, thus a draught or a breeze. Used casually as we see here, in conversation by Galen's boy patient, it has come to be regularly employed in medicine as denoting the peculiar sensation often felt by an epileptic subject immediately before his fit begins.]

Regarding the epileptic affections a careful distinction must be made; for in some of these the head alone is affected, while in others other parts are also involved. This fact has been overlooked by almost all physicians. . . . There are

three varieties, common to all of which is the affection of the brain, the condition either beginning here, as is most usual, or beginning in the stomach, and then, by sympathy rising to the brain. . . . Rarely there occurs still another kind of epilepsy—call it a genus or variety, if you like—which, starting from any part of the body, thence travels up to the head, its passage being felt by the patient.

This I first saw in a boy of some thirteen years of age, when I was myself a young fellow, in company with our leading physicians, who had met to consider the treatment. I heard the boy relate that the condition began in his leg, and rose thence straight up through his thigh, superjacent flanks, sides, and neck, right to his head, and that as soon as it reached this, he could no longer follow it. Asked, however, by the doctors what sort of thing it was that rose to his head, the boy was unable to say. Another young lad, however, older than he, not unintelligent, able to appreciate fairly well what had happened, and better able to explain than the other boy, said that what rose up was like a cold current of air (*aura*).

Our teacher Pelops thought that this must be one of two things, either some quality that was transmitted by the parts undergoing an alteration one after the other in series, or else some spirituous [*pneumatic*, gaseous] substance. He said there would be nothing strange if an abnormal humour was produced in the affected part, possessing extreme force (*dynamis*), like the poisons of venomous animals. For who would believe, if it were not often seen happening, that the sting of the scorpion or the bite of minute phalangia [cf. p. 196, footnote] could produce an extraordinary and extensive change throughout the whole body, despite the very small quantity of matter actually introduced into it by the animals? Thus we must suppose that in the case of the biting phalangium, small as the animal is, nevertheless some kind of venom has passed from its mouth into the part bitten. Again, the sting of the marine ray, as also that of the land scorpion, is seen to terminate in a very sharp point, which has at its end no perforation through which the venom could be injected; nevertheless we must suppose this venom to be some gaseous (*pneumatic*) or fluid substance, or something of minimum bulk but maximum force. Thus a person who had recently been stung by a scorpion said it was like being struck by hail; he became quite cold, had a cold sweat, and only just recovered with assistance.

Hence, as Pelops maintained, it is not impossible that some similar substance may be produced in the body without an external cause, and that, when it originates in a nervous (*neuroid*) part of the body, it transmits its force from one part to another right up to the source of the nerves [the brain], either, as I have said, by the parts becoming altered in a consecutive series, or by some gaseous substance being transmitted upwards, like a current of air (*aura*). . . .

Now, the sting of the scorpion can penetrate deep into the body, passing right through the skin. On the other hand, the bite of the small phalangia only occurs on the surface of the skin. Hence it is clear that sometimes the force of the venom is transmitted by the skin alone to the whole body. For the whole skin is continuous, and also nervous. It is therefore by no means impossible that the force of the injected venom is rapidly diffused all through it, from it then transferred, by contact, into each of the underlying parts, from these again into other parts adjoining, and once more from the affected parts into others, so that when it reaches one of the principal parts, the patient is in danger of death.

This is also shown especially well when ligatures are applied to the overlying parts, as these are obviously helpful. I have, in fact, noticed this in the case of vipers and scorpions, and also of asps, although one might be slow to believe it in view of the imminent risk of death. Nevertheless, when I was in Alexandria, a countryman not far from the city, having had one of his fingers bitten, bandaged its base tightly at the metacarpus, then ran into town to his regular doctor and asked him to amputate the whole finger at the metacarpal joint, his hope being that he would not suffer anything further. And indeed his hope was justified; he recovered without any further trouble.

Again, I have seen another individual recover by not only having his finger cut off, but also drinking some of a mixture prepared from adders. Then I once saw another rustic who, having had his whole finger bitten by a viper, took a pruning-hook which he had by him—he was a vinedresser—and amputated the wounded portion at the last joint; he recovered without taking any medicine, and his fingers healed with the ordinary applications.

So also with the case of the boy whose epilepsy had begun in his leg. The doctors who had met in consultation proceeded to treat him. They thought it well first to wash the

whole body and then to apply to the part a preparation containing thapsia or mustard, while in the meantime they bandaged the limb above the part first involved. In this manner they prevented any return of the attack, although these were occurring daily.

This, however, by the way. I have merely mentioned it lest any surprise be felt that such a serious ailment should arise from such an insignificant part.

It remains to inquire into the reason for the epileptic spasms produced by *sympathy*. For as regards these, neither Pelops nor any other of those with whom I consorted could say anything plausible. Once, then, I saw a victim of this sympathetic epilepsy fall down without showing any violent spasms, but with short rhythmic movements at intervals. It seemed to me that something was happening here like what one very frequently sees occurring in the stomach in *hiccough*. In fact I readily hiccough myself whenever I take too much pepper, and I have seen this in quite a number of other people whose stomachs are at all sensitive. Thus my observation was that, in this falling-sickness which is sympathetically produced, and does not arise idiopathically in the brain, there is a kind of rhythmic *clonus*, with intervals between, and not a constant spasm; I concluded, therefore, that here we had a movement in the brain like that occurring in the stomach when irritated. Thus hiccough is observed in it when it is overloaded with food or irritated by their corruptions. I have also not infrequently seen not merely hiccough, but spasm of the whole body produced by an acrid humour, and when this was vomited up the seizure at once stopped. Hence there is nothing surprising in the source of the nerves [brain] becoming involved in a similar movement, wherein it attempts to repulse whatever is brought up to it from the primarily affected part.

And similarly, it seems to me, all the other clonic symptoms of nervous tissue are produced, while those that cause the patient to fall down, senseless, but without spasmodic or pulsatile movements, are produced by excessive chilling. To this group also belongs *lethargus* (cf. p. 72).

Apoplexy, again, by its instantaneous onset, indicates that the more important cavities of the brain have become suddenly filled with a cold, thick, or viscid humour, and that the condition does not arise from a *dyscrasia* of its whole substance, like lethargus, phrenitis, the manias, melancholias,

idiocies, losses of memory, dullings of the senses, and paralyses of movement.

Now in all these affections, as in apoplexy, the amount of danger may be estimated by the degree to which breathing becomes impaired. For just as in sleepers the respiration continues although no other voluntary function takes place, and they lie supine and immovable on their couch, so also with all stuperose diseases; while the body is without feeling or movement, breathing alone continues, this being the function of the muscles which move the thorax. Of this fact we have definite knowledge based on logical proof, as also that the principle of all movement of muscles comes from the nerves that are inserted into them. Further, anatomy clearly shows us that the primary source of all the nerves is the brain. I do not simply say *source*, but add the word *primary*, in consideration of the spinal cord. For while out of this a large number of nerves can be seen issuing, yet the direction of all the powers they possess comes to the spinal cord from the brain.

When, therefore, you find the respiration to any extent impaired and becoming difficult, you may judge, in all diseases involving stupor, that a very serious state of affairs exists in the brain.

HOW TO DETECT MALINGERERS

[The author gives instances to show how ordinary common sense may often prove a useful ally of medicine proper.]

Greek text: Kühn, Vol. 19.

People pretend to be ill for many reasons, and it would seem a physician's business to discover the truth in all such cases. The laity also reckon him the one to distinguish those who are lying from those who are speaking the truth. Thus an inflammation, an erysipelas, or a swelling produced purposely by external application of drugs can be detected and distinguished by the physician from affections arising from within the body. Similarly also, when there is spitting of blood, he can distinguish that which originates in the mouth from that arising in the gullet, the stomach, or any of the respiratory organs.

Some individuals have been detected spitting blood intentionally at the end of a bout of coughing, there being a

vein which readily opened somewhere on their gums, and, whenever they wished, they sucked this with their tongue, and then, giving a cough, spat out blood as though it had come from below.

Others pretend to be delirious or even insane.

All these conditions the laity think ought to be discovered and distinguished from one another by the doctors.

Among such we may have a simulation of pain so severe as to seem unbearable. I once saw an individual who had been summoned by the citizens to the assembly, and who simulated colic in order not to be forced to go, since he thought this would be to his advantage. I suspected at that time that he was lying, and later on he confessed it to me himself. So I ordered hot fomentations to be applied. He did not, however, show any great desire to be helped, although he had previously been very easily frightened at trifles. Moreover, he knew that a few days before, someone suffering from colic had lost his pains entirely when he took some Philonian mixture; this he would have certainly asked me for had he been in pain. What subsequently happened will prove this, for when the assembly came to an end, his cries ceased, ostensibly because he had no more pain. And further, his previous regimen had not been such as could have set up a colic condition; such diseases usually come from indigestion or chills, and he had had nothing of the kind before this.

Now, to recognise that the disease did not correspond with the previous regimen was a matter of medical experience; but to suspect the patient to be malingering on account of the assembly was a matter belonging not to medicine alone, but to so-called "common sense."

This, however, although common to all, is by few possessed so perfectly that they manage to say or do the right thing on every occasion.

Of all I have said, however, let this be borne in mind, that medical experience united with the resourcefulness of common sense will detect people who are simulating, among other things, great pain.

Thus another case was that of an individual who stated that he was suffering extreme pain in his knee. He was one of those slaves who run alongside their masters in the streets. I observed that there was some pretence in this pain, my suspicions being aroused partly by the fact that the master was leaving town that day, and partly also by the young

man's character, as he was just the sort of man to tell lies of this kind. I therefore asked one of his fellow-slaves who knew him well whether the young fellow was in love with any young woman, on whose account he was likely to wish to remain at home when his master was starting for a somewhat long journey. And it was so.

Such matters, then, are resolved by external considerations. On the knee itself, however, was an extensive swelling, which might have alarmed a layman, but which to the expert in these matters had obviously been produced by *thapsia* [a substance like mustard]. Such a conclusion is the result of medical experience, and not one of those arrived at by external considerations. Also belonging to medical experience was the recognition that nothing had lately happened to him which could have suddenly brought about such a swelling. He had not been running overmuch, he had not been struck by anybody, he had not hurt himself by leaping or jumping over ditches, there was no sign of congestion (*plethora*) about him, apart from the fact that he had not previously led an idle life or been over-fed. Further, when I asked him what the pain was like, he did not give quick, ready, or consistent answers. Hence, when his master had left, I applied a drug which, while possessing no anodyne quality, was adapted by virtue of its chilling action for removing the condition produced by thapsia. After one hour I had him confessing that he had absolutely no pain, whereas, if the pain had actually come from inflammation, it would not merely not have been checked but actually made more severe by a cooling application.

It is thus surely now clear that a combination of medical experience with the results of ordinary reasoning is useful in the diagnosis of extreme pain. From the fact also that the pain is well borne one may conclude that it is not very bad. This conclusion is often, of course, formed when people who are pretending to be in great pain unwittingly throw themselves about from one position to the other, although, forsooth, they pretend to be unable to endure their sufferings. Moreover, if they are really in great distress, they are prepared to put up with any remedy; in fact they are themselves the first to beg the doctor to do anything he chooses, so long as their trouble is cured. If, on the other hand, they are only slightly pained, or not at all, they flee from such remedies, nor will they endure prolonged fasts or bitter medicines. We ought to tell them, when they say they have great pain, that these are

the only things which will cure such conditions; and, besides these, cutting or burning operations and abstinence from all articles of food and drink to which we see them addicted.

When those who allege great pain are really suffering, this is indicated also by the criteria of medical experience, among which are: obvious distress, cold extremities, pallor, sometimes also cold sweats, and a pulse which is not merely irregular (for this occurs also in people who are only in slight pain), but which tends to be of small rather than large in volume, and faint rather than vigorous. When the patient is asked what kind of pain he has, his answer indicates pain appropriate to the part affected. Thus some types of pain extend far and wide, while others are as though fixed and inherent in one part. In some cases there is a stabbing and throbbing, in others again it is as though the parts were being drawn asunder. Or the pain may be of a numb or a heavy character. Some types of pain cause vomiting, others gastric disturbance, others giddiness.

ON THE PRESERVATION OF HEALTH

(Book V., Chap. I.)

Greek text: Kühn, Vol. 6.

[The following extracts are from Galen's excellent work "On the Preservation of Health," in which various hygienic factors are treated in detail. He here takes to task contemporary writers of Rules of Health. They forget, he says, the first need of hygienic science, which is Individualisation. They talk as if there was a single "Hygienic Man," whereas there are countless different types, all of which must be separately studied. In other words, "What is one's man's meat is another man's poison."

And again, "Physician, heal thyself!"—many of these self-styled prophets of health are unable to keep themselves well. Galen contrasts his own experience with theirs; a weakly boy, he made his manhood strong by careful observance of rules, whereas others with an excellent heredity fall into chronic ill-health as a result of their own foolishness and intemperance.]

Amongst the chief essentials—indeed the elementary basis, as it were—of the whole subject of hygiene is the fact that

there are among people a great many different constitutions; and this is acknowledged by all doctors and gymnasts. The majority of them, however, write about hygienic treatment as though they were dealing with a single individual, and accordingly they give no proof of any single individual having been helped by them. They ought, however, to have pointed out not merely one but a great many individuals who, constantly ill before, had been eventually kept by them for many years free from disease; that is what they should have written about. For my part, however, I prove this by actual results; people who have before been constantly ill I keep free from disease by persuading them to follow hygienic precepts, and on these lines I proceed to write about them. Thus, some I forbid to take any exercise at all—that is to say, exercise by occupations—as I consider the ordinary functions of life enough for them. Some I order to abstain from excess of exercises, so as to reduce the whole to the smallest limits; some only to change the kind of exercises, or the order, or the time; some to alter their entire plan. Similarly, I give advice about bathing—either not to bathe at all, or more than before, or less, and only before meals, or also after meals; or with colder or warmer water than usual. Thus I have kept people well for a great number of years.

Yet I would have done none of these things if I had not known their natural physical differences, and the hygienic regimen appropriate to each.

Some people who write treatises on hygiene, or who, even apart from writing, give advice, are not able to keep themselves healthy; then people laugh at them, and among other remarks quote the well-known line:

"*Healer of others, himself a mass of sores.*"

Some of them then throw the blame on their want of leisure, while others confess that their illness comes from dissipation. In the latter case, to my mind at least, the defence is much worse than the accusation. From those, however, who refer the cause to accidents occurring in their daily lives, as when they catch a quotidian ague from over-heating, chill, exhaustion, or other similar causes, blame must be withheld, but not from those pleading any of the other causes. For I do not remain entirely immune from fever myself. I sometimes develop fever as a result of exhaustion, although I have now remained free from all other diseases for a great many years. In fact,

although I have received—in various parts of my body—wounds which, in the case of other people, would have produced inflammation and enlarged glands, followed by fever, I have had neither swelling of the glands nor fever. And I ascribe this experience to nothing else than a consideration of hygienic theory. For I had not the fortune to possess a healthy bodily constitution from the beginning, nor did I live an altogether free life; I had to toil in the service of my profession and to attend upon friends, kinsfolk, and fellow-citizens for many reasons. At night I did largely without sleep, sometimes on account of patients and always owing to my interest in education. Nevertheless, I have not had for a great number of years any of those diseases which originate in the body, except it might be, as I say, a quotidian fever, caused very occasionally by exhaustion.

Yet in my childhood, at least, and even at puberty and during adolescence, I suffered from quite a number of fairly serious illnesses. But after my twenty-eighth year I persuaded myself that there is an art of health, and since then I have followed its precepts for the whole of my life, so that I never have any disease, unless it be an occasional quotidian fever. . . . I maintain that not even a swollen gland can occur in those who are carefully instructed in health principles, if at least their body is free from every kind of superfluity, whether quantitative or qualitative.

Let this, then, suffice for those who are at present claiming to give hygienic precepts either in speech or writing. As regards the older writers, however, they need no contradiction; for we do not learn of them from other people's accounts that they either kept themselves free from disease or those who followed their counsels, or that they ventured in their writings to make any such boast. Let us only marvel that some of them claimed to include in one book the whole subject of hygiene—and (mark you!) they claimed to deal with the subject not like Hippocrates, who indicates the method under quite general preliminary headings, but by working out everything in detail!

I have stated the reason for the length of this treatise. Whoever, therefore, possesses both taste and assiduity must not be disconcerted at the length of the hygienic art, but must rather admire the wealth of its prescriptions. For how can its works be anything but great and marvellous, when they bring a person to extreme old age with all his senses intact, and keep

his body entirely free from disease and pain, so long at least as he has not been quite weakly from the beginning! On the other hand, I am quite sure that I have personally seen people who, though naturally healthy, have become diseased, and finally, at least in old age, have fallen into incurable illness, and who yet might, as far as their bodily habit (*hexis*) was concerned, have continued to extreme age with all their senses unimpaired and all parts of their bodies healthy.

Now, is it not a disgraceful state of affairs that a person who has had an excellent constitution should need to be carried about by other people owing to gout, or should be worn away by the pains of stone or colic, or of a bladder ulcerated by disordered humours (*cacochymy*)? Is it not disgraceful that a person should, by reason of that extraordinary thing, *arthritis*, be unable to use his own hands, and should need somebody else to bring food to his mouth, and to perform his toilet necessities for him? Unless one were an absolute weakling, one would prefer to die a thousand deaths rather than endure such a life. And even if, from softness and lack of pride, one overlooks the disgraceful aspect of this, yet one cannot overlook the pain these people suffer, night and day, as though their maladies were torturers, twisting them on the rack.

And the cause of all this must be referred either to dissipation or ignorance, or both together. The present is not the occasion to rectify dissipation, but I hope in this work to cure any ignorance as to what measures are necessary, by laying down the hygienic practice suitable for each particular bodily constitution.

THAT THE MENTAL FACULTIES FOLLOW THE BODILY CONSTITUTION

[The above title means, in modern language, that Psychology is a department of Physiology. A more literal translation of the Greek would be "That the faculties (or powers) of the soul follow the 'temperaments' (*crases*) of the body." It is to be noted that Galen here uses the term "follow" rather than "are caused by," but the essential intention is the same. His main argument in this treatise may be con-

sidered an expansion of that of Simmias in Plato's " Phædo," viz. that the soul is a " crasis and harmony " of the body (see p. 103).

" Soul " is a word which sounds more artificial in English than in other modern languages such as French and German, and generally the Greek noun is better translated by the adjective " mental," although perhaps " mental and moral " would often more completely render it. *Crasis* means a *mixture*; the word takes us back to the ancient doctrine of four elementary principles—heat and cold, moisture and dryness—of which the body itself, among other things, was believed to be a mingling. The word " temperament " formerly conveyed this general meaning in English, and *crasis* was therefore translated " temperament," but to the ordinary modern reader " temperament " has now only the derived meaning of " mental disposition." *Crasis* means a physical, not a mental condition, and hence I have usually preferred to leave the Greek word untranslated, or to render it by some such term as " constitution." The idea of *crasis* is constantly to the fore in the present work.

Thus Galen in this treatise adopts the deterministic position in psychology. Here the claims of man's " bodily envelope " are emphasised, much as are those of his " geographical envelope " by Hippocrates in " Airs, Waters, and Places "; indeed Galen repeats many of the arguments of Hippocrates' work in the present treatise (cf. p. 239). That, however, Galen recognised the deterministic aspect to be only one—although an important one—becomes abundantly clear from his other writings. Moreover, the authorities whom he here quotes in favour of his materialistic thesis—Plato, Aristotle, the Stoics, Hippocrates himself—would never have admitted more than a very relative determinism in psychology. If we follow the terminology employed by modern biologists such as Professors Patrick Geddes and J. Arthur Thomson, we may say that, while the present work deals in the main with *Bio-psychosis*, Galen elsewhere chiefly lays stress on the other and complementary aspect of conscious life, namely, *Psychobiosis*.]

Greek text: Teubner's " Galeni Scripta Minora."

[The thesis stated. Plato's tripartite division of the soul.]

The doctrine that the mental powers are consequent upon the bodily temperaments I have always found to be true, as well as useful for those who wish to keep their own minds in

order. This view I have formed after testing and examining the problem in all sorts of ways, not on myself alone, but at first in company with my teachers, and later with the leading philosophers. Thus, as explained in my work " On Habits," when we produce by means of food and drink and by our daily activities a good bodily temperament (*eucrasia*), we thereby also influence the soul towards goodness. Thus also Pythagoras and Plato and their followers, as well as certain other ancient philosophers, are reported to have acted.

. . . . . .

It has been elsewhere shown that there are three kinds of soul, and that such is Plato's view; also that one is located in the liver, another in the heart, and another in the brain. Further, Plato appears to be convinced that of these kinds or parts of the soul the rational part is immortal. For my part, I am not prepared to argue with him whether it is or not. First then let us consider the species of soul in the heart and liver, for both he and I agree that these perish at death. . .

I shall venture myself to say that not every kind of body is fitted to receive the rational soul. This seems to me to follow from Plato's teaching about the soul; still, I can give no proof of it, as *I do not know what the substance of the soul is*, if we regard it as belonging to the class of *incorporeals*. For in *bodies* I see the temperaments in large numbers and all perfectly distinct from each other, but of incorporeal substance which is able to exist in and for itself, and is not a quality or form of a body, I cannot conceive any distinguishing feature, although I have often looked into the subject with great care. . . .

[Effect of overmuch cold or heat.]

On the other hand, I know as a matter of clear observation that the evacuation of blood and the drinking of hemlock chill the body, while excessive fever overheats it. Again, then, I ask the same question, why, when the body is excessively chilled or overheated, does the soul definitely leave it? After much search I have not found out why; nor, again, why an excess of yellow bile in the brain induces delirium, or of black bile, melancholia, or why phlegm and chilling agents in general help to cause lethargus, whereby both memory and intelligence become impaired. Why also is mental dullness produced by a draught of hemlock? . . .

Again, wine obviously relieves all pain and trouble; of

this we see proofs every day. Zeno is reported to have said that he was affected by wine just as are bitter lupines when soaked in water. It is also said that the *œnopia* root has this effect still more, and that this was the drug of " the Egyptian stranger," as the Poet [Homer] says:—" Straightway she threw into the wine-cup a drug, and of this they drank—sorrow it allays and wrath, and it brings forgetfulness of all ills."

Enough as regards the œnopia root: we do not need it for our argument, since we can daily see wine having the effects of which the poets tell us:—" Honey-sweet wine distresses thee; others also it harms who take it greedily and drink not in due measure. 'Twas wine too that troubled the centaur, the far-famed son of Eurytus, what time he came to the Lapithæ in the hall of great-hearted Pirithous. When his mind was confused by wine, he went mad, and wrought evil in the house of Pirithous."

And elsewhere he says of it, " Wine which leads astray, which makes even the very wise to sing, to laugh gently and to dance, yea, to utter words which were better unspoken."

Thus also in the words of Theognis:—" The drinking of much wine is an evil—yet if it be drunk with understanding, it is a good thing and no evil." In fact, if it is drunk in moderation it helps the coction (*pepsis*) of food and its absorption and distribution (*anadosis*), also blood-formation and nutrition generally; it likewise makes our souls at once milder and bolder—acting, of course, through the bodily *temperament* [*crasis*], which again is produced by means of the *humours*.

And as I say, not only does the physical temperament change the functions of the soul, but it may even drive this out of the body. What else can one say when one sees chilling or heating drugs rapidly killing those who take them? And the poisons of animals are of the same kind. We see people who are bitten by a viper dying immediately, almost like those who die from drinking hemlock: the probability being that the venom of this animal has also a chilling action.

[Effect of overmuch dryness and moisture.]

Now, can it be that while the mental faculties are changed by the blending of hot and cold, they are not affected by that of dry and moist? But that the latter also is important we have undoubted proofs in connection both with drugs and with daily regimen—these proofs I shall perhaps refer to later on, but first I will recall Plato's argument—that bodily

humidity causes the soul to become forgetful of what it formerly knew, before becoming bound up with the body. This apparently is what he means by the following words in the "Timæus," in that passage where he says that the gods, in creating man, unite an immortal soul "with a body liable to influx and efflux"; here he clearly symbolises the essential moisture of new-born children. And next he says as follows:—

The soul is at the commencement deprived of intelligence when it is first bound up with a mortal body; but, when the flow of growth and nutriment becomes less, and the soul's revolutions resume their peaceful way, and in the course of time become more stabilised, then each of the cycles falls into its natural course."

. . . . . .

When Plato speaks of "the flow of growth and nutrition" becoming less, he obviously means the moisture previously mentioned as depriving the soul of intelligence, since dryness gives it understanding, and moisture the opposite. . . .

Since, therefore, the rational principle of the soul, with its uniform substance, changes in accordance with the bodily temperaments, what are we to suppose is likely to happen to the mortal part of the soul? Surely we may be certain that this is entirely subservient to the body—or more exactly, not to use the term subservience at all—that the mortal part of the soul is nothing more or less than the bodily *crasis* itself. That is to say, the *crasis* of the heart is the irascible [second] principle of the soul, while the liver-crasis is the [third] principle, called appetitive by Plato, and nutritive or vegetative by Aristotle.

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[The Stoic doctrine of the Soul confirms this theory.]

According to the Stoics, the soul [*psyche*], like the physiological nature [*physis*], is a kind of breath or *pneuma*, the pneuma of the soul being moister and colder, and that of the physis dryer and warmer. Hence this pneuma also is a kind of matter proper to the soul, while the *form* of that matter depends upon the proportionate mixing of the *aerial* and of the *fiery* substance. For it is not possible to say that the soul is either air or fire alone, since an animal's body cannot become either absolutely cold or absolutely warm, or even dominated by one or the other in great excess: thus when the animal

departs even to a small extent from symmetry, it becomes fevered if fire be in great excess, and chilled, livid, and partly or entirely without feeling when air predominates; for this latter in itself is cold, but acquires a good temperament (*crasis*) when mixed with the fiery element.

It is now clear to you, therefore, that, according to the Stoics, the substance of the soul results from the way in which air and fire are mixed; Chrysippus is intelligent because these are well mixed in him, while "the sons of Hippocrates," whom the comic writers deride for their foolishness, are swinish by reason of excess of air in the mixture.

Perhaps then someone will say that neither should Chrysippus be praised for his intelligence nor these others blamed for their stupidity; again, that those continent as regards the appetitive part of the soul do not deserve commendation, nor the licentious blame; also similarly with respect to the acts and affections of the irascible principle, we must neither blame the cowardly nor praise the daring.

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[Further admissions by Plato.]

If, again, we suppose, with Plato, that the soul is incorporeal, and has its own peculiar nature, yet Plato himself agrees that it is mastered and enslaved by the body, having regard to the ignorance of infants, the foolishness of old age, as also to the delirium of insanity or loss of memory which is caused by drugs or by certain harmful humours generated in the body. That these should be followed by loss of memory, of intelligence, movement or sensation, might be attributed to the soul's natural powers being *hampered*; but when a person thinks he sees what is invisible, and hears words that no one has uttered, and says things that are shameful, impious, or utterly incomprehensible, this indicates not only destruction of the soul's original innate faculties, but the actual introduction of faculties opposed to these. This then already arouses great suspicion regarding the whole substance of the soul—that, in fact, it may not be incorporeal! For how could it be driven by association with the body into a nature opposite to its own, if it were neither a quality, a form, an affection, nor a faculty of the body? . . . .

That even Plato himself recognises that the soul is damaged by *cacochymia* [endogenous toxæmia] in the body this next quotation will make clear:—"Where acid or saline phlegm, or bitter and bilious humours of any kind, wandering through

the body, fail to find a vent externally, and, revolving in the interior, mingle their own vapour with the workings of the soul, they cause all sorts of mental diseases, more or less strong, and more or less in number. According as they are carried into the three divisions of the soul and lodge in one or other at different times, they produce all kinds of irritability and depression (*dysthymia*), also of courage and cowardice, of bad memory and slowness in learning." In this passage Plato obviously acknowledges that the soul suffers to some extent from the bad humours (*cacochymy*) of the body, just as, again, it is pathologically affected by bodily habit (*hexis*), as the following statement shows:—"The truth is that sexual immoderation belongs in great part to a particular kind of bodily habit, fluxional and moist, which is due to porosity of bones and leads to mental illness." . . . And no less clear does the sentiment of the philosopher become in what he subsequently writes. "Almost everything that is called intemperance in pleasure, and is blamed as though engaged in wilfully, is wrongly blamed. For *no one is wilfully bad*; he becomes bad through a faulty habit of body, or through ignorant upbringing; these harmful things happen to everyone even despite his will."

That Plato himself homologates what I have already pointed out is therefore clear, both from these statements and from many others, some of which are to be found in the "Timæus," like those here given, and some in other of his books.

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[Aristotle quoted to the same effect.]

As regards Aristotle, also, it is clear from his statements that he believes the mental powers to depend on the crasis of the maternal blood, from which, according to him, our blood has its origin. In the second book of "The Parts of Animals" he writes as follows:—"Thick and warm blood is more productive of strength; thin and cold blood rather of sensibility and intelligence. And the same difference exists in fluids analogous to blood. Thus even bees and other similar creatures are naturally more intelligent than many which possess blood; and of the latter those with cold, thin blood are more intelligent than others. The best are those whose blood is warm, thin, and pure, this being good both for courage and the like, and also for practical wisdom."

. . . . . .

Aristotle next proceeds as follows:—" The nature of the blood has many results, both as regards the character of animals and the keenness of their sensibility. For nutriment is matter, and blood is nutriment in its last stage; hence there is much difference according as the blood is warm or cold, thin or thick, clear or turbid."

. . . . . .

Now since other statements of Aristotle are to be found in his works " On Animals," and the books of " Problems," it seems to me superfluous to quote all. Enough that I have pointed out his opinion regarding bodily *crases* and mental faculties. I will, however, also add the statements he makes in the first book of his " History of Animals," some of which refer to crasis directly, and some indirectly, by way of *physiognomical signs*. His view is that the building up of the whole body in each kind of animal takes place in conformity with the mental character and faculties. Thus animals which possess blood develop from their mother's blood, and their mental characters result from the crasis of this blood (as has been made clear by previous statements), and the building up of the organic parts takes place in conformity with the mental characteristics. And similarly quite a number of indications can be observed regarding mental characters and bodily crasis. Some of the physiognomic signs indicate the crasis directly and without any intermediary. Such are to be seen in the colour and in the hair; also in the voice and in the functions of parts. So let us now hear what Aristotle writes in the first book of his " History of Animals ":—" The part of the face below the sinciput [*bregma*] and between it and the eyes is the forehead. Those in whom this is large tend to be slow; those in whom it is small are active; those in whom it is flat are excitable." Such is one statement; another shortly after it is as follows:—" Under the forehead are the twin eyebrows; these when straight are a sign of gentle character; when they curve towards the nose they indicate austerity; when towards the temples, mockery and dissemblance; when they are drawn down, this indicates jealousy." . . . Moreover, he writes after this:—" Of eyes, some are big, and some small, and some medium-sized; the latter are the best. Also they are either very sunken or very protruding, or between these; of such the most sunken have the keenest vision in all animals, while the medium-placed are a sign of the best disposition. Eyes may also tend to blink, or be staring, or something between these;

the latter condition is the best sign, while of the other two groups the one indicates shamelessness and the other inconstancy."

Again, a little further on, in discussing the ears, he writes as follows regarding their size: "They are either large, small, or medium-sized, or they project extremely, or not at all, or moderately. Those between the extremes signify the best disposition, while large protruding ears are a sign of foolishness and loquacity." Thus Aristotle writes in the first book of his "History of Animals." He also recalls not a few examples in another book on "Physiognomical Principles"; from these I would add some sentences, but that I should incur a charge of prolixity and of vainly wasting time; for I am able to bring forward as witness the first of all physicians and philosophers who discovered this theory—the divine Hippocrates himself.

[Here follow a series of passages from Hippocrates' "Airs, Waters, and Places," showing how men's mental and moral as well as bodily constitutions depend on the nature, as that on the *crasis* of the country they inhabit. Seasonal changes are particularly important, and Galen especially singles out the references to differences between Asiatics and Europeans.]

. . . . . .

Thus throughout his discussion on the *crases* of weather and waters, Hippocrates shows that the mental faculties follow the bodily constitution, also that this applies not only to the *irascible* and *appetitive* parts of the mind, but to the *rational* as well. For these facts Hippocrates would prove the most reliable of all witnesses, were it here desired, as is so often done, to base the truth of assertions on the authority of witnesses. For my part, however, unlike the majority of men, I do not believe in Hippocrates as a witness; it is because I see that his demonstrations are well-founded that I praise him. For who does not see that, both bodily and mentally, all people who live in northern regions are the very opposite of those living near the torrid zone? And who does not know that people living midway between these two, and inhabiting a well-tempered region surpass them in body, in mental character, in intelligence, and good sense?

[Plato on the effect of localities.]

Now, some of those who call themselves Platonists hold that

while *in disease* the mind is impeded by the body, yet *in health* it carries out its proper functions without help or hindrance from the body. I shall therefore quote some statements of Plato in which he affirms that it is through the *crasis of places* that people are helped and hindered with respect to their intelligence.

At the beginning of the "Timæus" he writes:—[1] "After the Goddess [Minerva] had arranged you first in all this organisation and order, she planted you down; choosing the place where you were born, and seeing to the *eucrasia* of the seasons, in order that the wisest men might be there produced." To which he next adds: "So it was in her love of effort and of wisdom that the Goddess first chose this for a dwelling-place, as likely to produce men most serviceable to her." From these passages then it is already clear that Plato attributes a great influence to *the region*, but also in the fifth book of the "Laws" he writes to the following effect: "Yes, indeed, Megillus and Cleinias, do not forget this about localities, that some differ from others, giving birth to better or worse men." . . .

And once more he adds: "Some are rendered monstrous and strange in form by winds of every kind and by exposure to sun, others by waters, and others by the very food which the earth produces, and which can not only make bodies better or worse, but can equally well endow souls with the various qualities referred to." In this passage he clearly says that winds and exposure to the sun-heat have an effect on the mental powers.

Some may suppose, however, that while men may be made mentally better or worse by the winds, the warmth or cold of the surrounding air, and the nature of the waters and the food, yet that it is *not through the medium of the crases* that these good and bad qualities are produced in the mind—in fact they might even be the consequence of intelligent education. I am personally certain, however, that each article of food is first swallowed into the stomach, and is there elaborated; that after this it is taken up by the veins which pass from liver to stomach; that it then produces the body juices or humours, from which are nourished, among other parts, the brain, the heart, and the liver, and that in the process of nutrition these

[1] An Egyptian priest is here explaining to Solon how the first Athenian republic was formed, before the last deluge.

organs become *warmer*, *colder*, or *moister* according to the powers of the predominant juices. . . .

[Plato on bodily temperatures and the use of wine.]

I will again remind them [the Platonists], even if they do not wish it, that Plato himself, whose name they have usurped, writes on these matters, not merely once or twice, but quite a number of times. Hence, in regard to the present question, it will be enough for me to add certain passages; two of these about the drinking of wine, are from the second book of the " Laws," and another, about food, from the " Timæus." The sentence from the second book of the " Laws " runs thus: " Shall we not first make a law that children must not touch wine at all till they are eighteen? our reason being that, in consideration of the passionate constitution (*hexis*) of young people, one should not ' pour fire on fire ' into their bodies and souls before they have begun to put their hands to work. And after this, while a young man may drink wine in moderation up to the age of thirty years, he must refrain entirely from drunkenness and excess in wine. But on reaching the age of forty, then, at the end of a banquet, one may call on the various gods and invite, especially, Dionysus to be present at what is at once the finishing and the beginning of grown men's education. This the god has bestowed upon mankind as a resource against the austerity of age, as a medicine to bring forgetfulness of trouble and depression, to make the hardened mentality softer and more malleable, like iron that is laid in the fire." On consideration of this sentence, I invite our distinguished Platonists to keep in mind what is there said, not only about wine-drinking but about differences in ages. He calls the nature of young men passionate, and that of old men austere, spiritless and hard; not, however, by reason of the number of years, but in correspondence with the bodily *crasis* which prevails at each age. For young men are by nature warm and full-blooded, old men bloodless and cold. Therefore wine is useful to old men for changing senile coldness to the proper proportion of heat, while with adolescents it has the opposite effect; it overheats their effervescing and highly mobile natures, bringing about immoderate and excessive movements.

Now these and many other statements about wine-drinking have been made by Plato in the second book of the " Laws," and will be found useful to those who care to read them. I

shall recall only one more of his statements. This occurs quite at the end of his discussion on wine, where he gives preference to a law of the Carthaginians. The passage is as follows:—"But still more than the usage of the Cretans and Lacedæmonians I should prefer the Carthaginian law to the effect that nobody while on military duty must ever taste this drink, but must keep entirely to water the whole time; that in the city no slave, either male or female, must taste wine at any time; nor the presidents during the year of their presidency, nor the helmsmen, nor the judges when on duty; neither must anyone do so who is taking part in any deliberation of importance; nor, speaking generally, must anyone drink during the day, save in view of physical exercise, nor at night when he or she intends to procreate children. And many other occasions might be mentioned when intelligent people possessed of a proper custom abstain from wine." Now Plato here is speaking not of sick, but of absolutely healthy bodies. And if, my worthy Platonists, you suppose that healthy men can command an army, govern a state, judge a case, or steer a ship, then answer me this. Does not wine act like a tyrant, forbidding the mind to think as carefully as it formerly did, and to act as correctly as it formerly did? And was it not for this reason that Plato tells us to avoid it as an enemy? For if it once gets into the body, it prevents the steersman from handling the ship's rudder properly, and the soldiers from keeping order in the ranks; it makes judges vacillate when they ought to be just; it makes presidents rule badly, and impose unsound ordinances. Plato considers, in fact, that wine fills the whole body, and especially the head, with hot fumes, thus causing immoderate motion in the appetitive and irascible parts of the mind, and hasty judgment in the rational part. And further, if this is so, it is obviously through the medium of the *crasis* that the mental functions in question are damaged when we take wine—or, again benefited, as the case may be. In fact, if you wish, I will demonstrate to you at another time in what way wine, *by its heating effect*, naturally harms or helps us; meantime, however, I shall quote the statement from the "Timæus," in which Plato proceeds as follows:—"We all become wicked through two causes quite independent of our will, and for which the parents are always more blameworthy than the offspring, the nurturers than the nurtured." And again: "Attempt must be made as far as possible, by nurture (*trophé*), by occupations, and by education

(*mathemata*) to avoid evil, and choose its opposite." For since occupations and education are destructive of evil and productive of virtue, so also is nurture. And while nurture (*trophé*) sometimes means not only food but the whole regimen of children, yet one cannot say that in the present instance the term is applied by him in the latter sense—for he is not exhorting children but full-grown men when he says, "Attempt must be made as far as possible, by nurture, occupations," etc. Thus by *occupations* he means gymnastic and musical exercises; by *education*, geometry and arithmetic, and by *nurture* one can understand nothing else than foods, broths, and beverages, to which latter belongs wine, about which Plato has discoursed at such length in the second book of the "Laws." And if anyone wishes, independently of Plato, to know all about food-values, he may read three books of my own on this subject, as also a fourth "On Humours Good and Bad," which I have mostly used for the present purpose.

. . . . . .

[Who then is to be praised or blamed?]

How then, it will be asked, can one be justly praised or blamed, hated or loved, seeing that he has become wicked or good not of himself, but through the *crasis*, which he obviously receives from other causes? Because, I reply, *we all have the fundamental power* of welcoming the good, of admitting and loving it, and of shunning, hating, and fleeing from evil, without first considering whether this power has or has not been *created*. Thus, we destroy scorpions, venomous spiders, and adders, which have been made what they are by nature and not by themselves. And rightly too we hate wicked men without first considering the cause that made them such. On the other hand, we welcome and love good men, whether they have become such by nature, by education and instruction, or by free choice and practice. Moreover, we kill the incurably wicked, and justly, for three reasons: in order that they may not harm us by continuing to live; in order that they may inspire others like them with fear of being punished for their misdeeds; and thirdly, because it is better for themselves to die, since they are so corrupt in soul that they could not be re-educated by the Muses themselves, nor made better by a Socrates or even a Pythagoras.

[A final hit at the Stoics.]

In this connection I am amazed at the Stoics, who consider that all mankind are essentially fitted for acquiring virtue, but that they become perverted by their fellow-men. For, leaving aside all other considerations which overthrow their arguments I will only ask one question, viz. about the first inhabitants of the world, who had no predecessors. Whence or from whom did perversion come to these people? The Stoics cannot answer this question, nor, again, when they see at the present day little children very wicked, can they say who taught them their wickedness, especially when there are many other children who have had the same upbringing as they, under the same parents, tutors, or schoolmasters, and whose nature is directly contrary to theirs. . . .

One must therefore keep a watchful eye on such statements made by our modern philosophers. Or perhaps it would be better not to call them philosophers, but self-styled philosophers; for if they had been real philosophers, they would have made it their first care to base their demonstrations on clearly observed facts. And this, it would seem, is especially what the most ancient philosophers did, and they were called wise among men not because they wrote treatises or brought out systems of dialectic or physics, but because they based their system of virtuous living on clearly observed facts, and exercised these virtues by deeds, not words.

. . . . . .

[Summing up.]

Thus my thesis agrees with clearly observed facts; it explains the reasons for the way we are affected by wine and certain drugs, by good and bad diet; it explains how we are aided or harmed by our occupations and our studies; and, last but not least, it gives the reason for the physical differences in children. Those who do not consider that the mind is helped or harmed by the bodily crases can tell us nothing about the differences in children, nor can they explain the help we derive from diet; nor again why there are so many differences in character, some individuals appearing spirited, others spiritless, some intelligent and others not so. In fact, in Scythia there has only been one philosopher, but in Athens many; in Abdera, on the other hand, there are many unintelligent people, but in Athens few.

APPENDIX A

THE "PLAGUE" AMONG THE CARTHAGINIANS AT SYRACUSE, 397 B.C.

(Diodorus Siculus, Library of History, XIV, Chaps. 70, 4—71. First century B.C., Teubner text, Vol. III (1893).)

AFTER the Carthaginians had captured the suburb and plundered the temple of Demeter and Core, a disease (*nosos*) fell upon their army. This god-sent calamity was increased by the crowding of tens of thousands into the same place by the fact that the time of year was very conducive to disease, and, in addition, by the extraordinary heats prevailing that summer. It seems that the place, too, had something to do with the intensity of the trouble; for when the Athenians had earlier occupied the same camp, many of them had perished from disease,[1] the place being marshy and low-lying. At first, before sunrise, owing to the coldness of the air from the marshes, shiverings were produced in the body, while the heat of midday naturally had a stifling effect upon such a crowd gathered together in a confined space.

This malady, then, first attacked the Libyans, many of whom died; the dead were buried at first, but afterwards, when their numbers increased and those attending the sick were seized by the disease, none dared to approach the sufferers. Thus, aid being withdrawn, there was no more help against the trouble. Owing to the stench of unburied corpses, and the putridity arising from the marshes, the disease began with catarrhs; later, swellings supervened about the throat, succeeded shortly afterwards by fevers, muscular pains in the back, and heaviness of the legs. Thereafter followed dysenteries, and small ulcers (*phlyctænæ*) over the whole surface of the body.

Such was the affection in the majority of cases. Others were effected by madness (*mania*) and complete loss of memory;

[1] Cf. Thuc. VII, 47.

they would walk about the camp in a distracted condition and strike people they met. As a general rule also medical assistance was of no avail, owing both to the intensity of the disease and the suddenness with which death arrived; for victims died on the fifth, or more often the sixth day, enduring terrible agony—so much so that all men pronounced those happy who had fallen in the war. Indeed everybody who came much about the sufferers fell a victim to the disease; consequently the plight of the sick was terrible, for none would help them in their trouble. It was not only complete strangers who deserted one another, but brothers were forced to sacrifice brothers, and friends their acquaintances, through fear for themselves.

APPENDIX B

(AETIUS OF AMIDA)

(Sixth Century A.D.)

(Text of S. G. Zervos, Athens, 1909.)

Aneurysms

Aneurysms occur in every part of the body, but especially beside the windpipe, in the formation of the so-called aneurysmal bronchocele; this is caused, particularly in women at childbirth, during forcible holding of the breath; it also occurs in the arterial parts of the head, and in other places where an artery has been wounded—thus in cases where physicians, in carelessly opening the lower vein in the elbow, cut at the same time the underlying artery. Usually the formation of an aneurysm is through percolation of *the blood and air which is contained in the arteries*, or by anastomosis of arteries, or by their rupture; the blood and air escape gradually and collect under the skin. Signs which accompany an aneurysm are: a small or large swelling, of uniform colour, painless, extremely soft and elastic. It yields to the pressure of the fingers, so as to become almost imperceptible, and then again rapidly swells up. This especially happens in aneurysms below the jaw, and such others as have developed apart from traumatism; in cases which have been preceded by damage to the artery, or in those caused by cicatrisation of the skin, the swelling is not equally soft, owing to the blood being greater in quantity than the air, and becoming clotted and so making the swelling tense all over.

Such, then, are the signs of the condition; no surgeons, however, will have anything to do with it when it occurs in the throat or the head; for as soon as an aneurysm is opened there takes place a most violent hæmorrhage, very difficult to check, and at the same time a great quantity of vital pueuma (spirit) escapes; hence the individual undergoing operation runs the risk of dying on the physician's hands.

In the case, however, of aneurysm in the hollow of the elbow, we proceed thus: we first mark carefully the artery as it leads from above along the inside of the upper arm from the axilla to the elbow, and we make a simple incision along the inside of the arm, three or even four fingers' breadths below the axilla, where the artery mostly becomes palpable. Then gradually laying it bare, we gently strip it and free it from surrounding structures; then, drawing it up with a blunt hook, we apply two strong ligatures of twisted flax, at an interval of the breadth of a thick finger from one another. Tying these very firmly, we sever the artery midway between the ligatures; then, having filled the wound with manna and inserted a drain [of lint] we apply bandages. Thereafter we incise the swelling in the hollow of the elbow, having no further fear of hæmorrhage. After turning out the clots we search for and find the bleeding artery; this we draw out with hooks and ligature it like the former one; then again, filling the wound with manna, we have recourse to the *suppurative treatment.*

Where aneurysms are in the neighbourhood of the windpipe, use cypress plaster, such as has been described among the absorbent preparations.

Fatty Tumours

The steatoma is an abnormal growth of fat, which varies according to the nature of its site. It is of a uniform colour, yielding to the touch; at first it is small, but in time it enlarges. Most of them have their greatest circumference at the base; rarely they are found with a narrow base and widening towards the summit.

The fatty tumour differs from the strumous in being softer to the touch; it differs from the atheroma or the meliceride in being solid and not pitting on digital pressure; it also is cured by operation.

In operating, the incision is made right across the summit of the tumour, and is either simple or myrtle-leaf shaped [elliptical] according to the tumour. The capsule is now boldly cut away, for in these cases we do not fear sinus-formation in connection with the sac, as in melicere tumours or atheromas, since here the fat does not fall out when cut into. And there is another thing to bear in mind, as has been pointed out regarding strumous glands: if the steatoma is merely attached,

one secures it by stripping it at the sides and below and shelling it out, now with the fingers and now with the handle of the knife; but, if it be closely adherent, then it must be dissected out. Then, after removal, the lips are stitched up, with a view to union; otherwise the bottom of the wound may be drained, and treatment by suppuration promoted.

In the case of the steatoma which becomes broad towards its apex, its base being narrow and thin, it is not necessary to do anything more than to cut away the whole tumour at its base; thus the whole operation becomes a very simple one, and there is a minimum of ulceration; and the treatment is correspondingly simple. It is said that fatty tumours are absorbed by the soft flowers of oxeye together with wax and old oil, or by roots of cyclamen taken with old ajuga (?). Use also the plasters already mentioned in reference to melicere tumours, and especially that made of sulphur and soda, and the similar ones thereafter described.

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